STATE OF WASHINGTON
DEPARTMENT OF NATURAL RESOURCES

ROAD PLAN

Name of Sale Tower

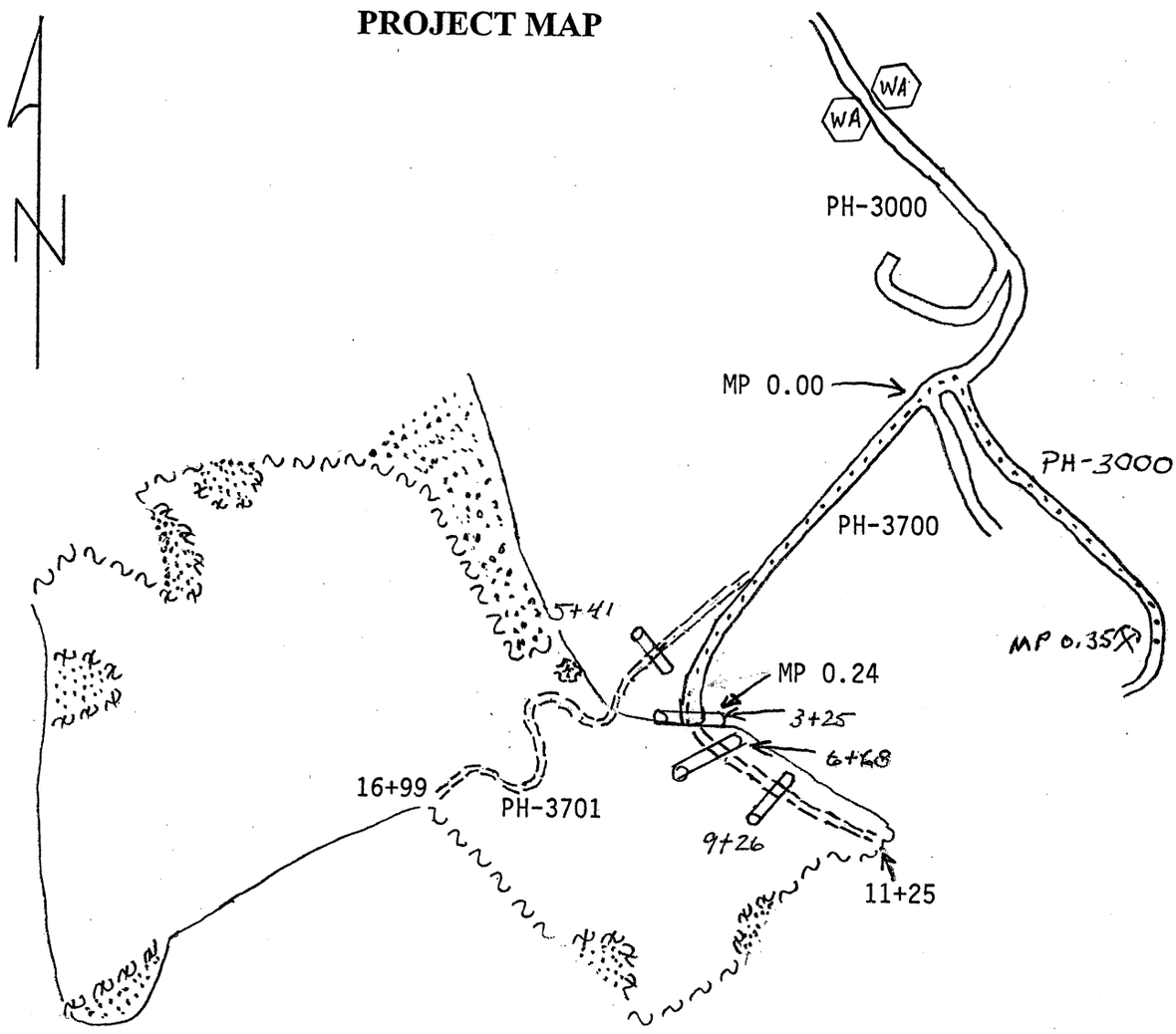
Pacific Cascade Region

Application No. 76209

County Cowlitz

Section 19 Township 6 North, Range 2 East, W.M.

PROJECT MAP



Legend

- Existing Roads
- Pre-haul Maintenance
- Required Construction
- Culverts
- Waste Areas
- Sale Boundary Tags
- Leave Tree Areas
- Rock Pit

Scale: 1" = 600'

Road Plan

Date: 3/30/2004

Sheet 1 of 30

STATE OF WASHINGTON
DEPARTMENT OF NATURAL RESOURCES

ROAD PLAN

SALE NAME: Tower

ROAD PLAN DATE: 03/30/2004

SECTION 1 - GENERAL CLAUSES

1.1-1

Clauses in this plan apply to all construction or reconstruction including landings unless otherwise noted.

1.1-3

Construction or pre-haul maintenance of the following road/s is not required. Roads used by the Purchaser shall be constructed or reconstructed on the State's location and in accordance with this Road Plan.

Road	Stations	Type
PH-3000	MP 0.00 to 0.35	Pre-haul maintenance
PH-3700	MP 0.00 to 0.24	Pre-haul maintenance
PH-3700	0+00 to 11+25	Construction
PH-3701	0+00 to 16+99	Construction

Pre-haul maintenance consists of reconstructing ditches, re-grading the road, relocating two segments of the PH-3700 road from 1+75 to 3+25 and 8+50 to 9+50 (intersection realignment), roadside brushing and rock patching on the relocated segments.

1.1-4

If the Purchaser desires a road location or design change, a written request shall be submitted to the State for consideration.

1.1-5

On this plan quantities are minimum acceptable values. Additional quantities required by the State because of hidden conditions or Purchaser's choice of construction season or techniques shall be at the Purchaser's expense. Hidden conditions include, but are not limited to: solid subsurface rock, subsurface springs, saturated ground, and unstable soil.

1.2-1

The construction or reconstruction of all roads specified herein shall not be permitted between November 1 and April 30 unless authority to do so is granted, in writing, by the Contract Administrator.

1.2-2

Purchaser shall not use roads constructed or reconstructed under this Road Plan for hauling, other than timber cut on the right-of-way, without written approval from the Contract Administrator.

1.2.1-1

Pioneering shall not extend past construction that will be completed during the current construction season. Drainage shall be provided on all uncompleted construction as approved, in writing, by the Contract Administrator.

Clearing and grubbing shall be completed prior to starting excavation and embankment.

Culvert placement in live streams shall precede embankment where culverts are to be placed along natural ground.

Culverts shall be installed in completed subgrade as construction progresses.

Subgrade, ditches, and culvert installations shall be completed and are subject to written approval by the Contract Administrator prior to rock application.

1.4-2

The following Road/s shall be constructed in accordance with construction stakes.

STATE OF WASHINGTON
DEPARTMENT OF NATURAL RESOURCES

ROAD PLAN

SALE NAME: Tower

ROAD PLAN DATE: 03/30/2004

Road	Stations
PH-3701	0+00 to 16+99
PH-3700	0+00 to 11+25

1.4-3

Reference points (R.P.'s) that are moved or damaged at any time during construction shall be reset in their original locations by the Purchaser. Excavation and embankment shall not proceed on road segments controlled by said R.P.'s until all moved or damaged R.P.'s are reset.

1.5-1

Maintenance on roads listed in Contract Clauses C-50 (Purchaser Road Maintenance and Repair) and C-60 (Designated Road Maintainer) shall be performed in accordance with Forest Access Road Maintenance Specifications.

1.5-3

Snowplowing will be permitted only after execution of a "Snow Plowing Agreement", which is available from the contract administrator upon request.

SECTION 2 - CLEARING

2.1-1

Fell all vegetative material larger than 6 inches DBH or over 20 feet high between the marked right-of-way boundaries and within waste areas or if not marked in the field, between clearing limits specified on TYPICAL SECTION SHEET.

2.1-3

Right-of way timber shall not be decked within the grubbing limits or in locations that interfere with construction of the road prism or impede drainage.

SECTION 3 - GRUBBING

3-1

All stumps shall be removed that fall between grubbing limits shown on the TYPICAL SECTION SHEET. Those outside the grubbing limits but with undercut roots shall also be removed. Stumps over 22 inches diameter shall be split. Stumps over 40 inches shall be quartered.

3-2

Grubbing limits are defined as the entire area between the external limits shown on the TYPICAL SECTION SHEET.

SECTION 4 - DEBRIS DISPOSAL AND REMOVAL

4.1-1

Right-of way debris is defined as all vegetative material larger than one cubic foot in volume, within the clearing limits

4.2.3-3

Right-of-way debris shall not be placed against standing timber.

4.2.3-4
Right-of-way debris shall be scattered outside the grubbing limits.

SECTION 5 - EXCAVATION

5.1-1
Unless controlled by construction stakes or specific design sheets herein, roads shall be constructed or reconstructed in accordance with dimensions shown on the TYPICAL SECTION SHEET.

5.1-3
Road grade and alignment shall conform to the State's marked location. Grade and alignment shall have smooth continuity without abrupt changes in direction. Maximum grades are 18 percent favorable and 12 percent adverse or as specified on drawings. Minimum radius curve is 60 feet.

5.1-4
Extra widening on the inside of curves shall be:

2 feet extra	80 to 100 foot radius curve
4 feet extra	60 to 80 foot radius curve

5.1-8
Excavation slopes shall be constructed no steeper than shown on the following table (except as construction staked or designed.):

Material Type	Excavation Slope Ratio
Common Earth (on side slopes of 55%)	1:1
Common Earth (55% to 70% sideslopes)	3/4:1
Common Earth (on slopes over 70%)	1/2:1
Fractured or loose rock	1/2:1
Hardpan or solid rock	1/4:1

5.1-9
Excavation and embankment slopes shall be constructed to a uniform line and left rough for easier revegetation.

5.1-10
Embankments shall be widened as follows:

Height at Centerline	Subgrade Widening
Less than 6 feet	2 feet
6 feet or over	4 feet

5.1-11
Embankment slopes shall be constructed no steeper than shown on the following table:

Material Type	Embankment Slope Ratio
Common Earth and Rounded Gravel	11/2:1
Angular Rock	11/4:1
Sandy Soils.	2:1

5.1-12
Organic material shall be excluded from embankment and from waste material deposited on slopes in excess of 40 percent.

5.1-14
Where side slopes exceed 45 percent, full bench construction shall be utilized for the entire subgrade width .

STATE OF WASHINGTON
DEPARTMENT OF NATURAL RESOURCES

ROAD PLAN

SALE NAME: Tower

ROAD PLAN DATE: 03/30/2004

Where side slopes exceed 45 percent, full bench construction shall be utilized for the entire subgrade width .

5.1-15

Waste material may be deposited adjacent to the road prism on side slopes up to 45 percent if the waste material is compacted and more than 50 feet away from live streams. On side slopes over 45 percent, all excavation shall be end hauled or pushed to designated embankment sites. All waste embankments shall be compacted in horizontal layers not exceeding 2 feet.

5.1-16

On the following road/s, full bench construction shall be utilized with all excavated material end hauled or pushed to designated waste areas.

End Haul/Waste Material Disposal

Road	Stations	Waste Area Location	Remarks
PH-3700	2+50 to 10+75	PH-3000	Approx. 6000 CY
PH-3701	0+00 to 7+00	PH-3000	Approx. 5000 CY

Additional waste areas can be found on the PH-1000 and the PH-3900 roads.

5.1-21

Waste material shall not be deposited within 50 feet of a live stream.

5.1-24

Turnouts shall be intervisible with a maximum of 1,000 feet between turnouts unless shown otherwise on drawings.

5.2-1

Road pioneering operations shall not undercut the final cut slope, deposit excavated material outside the right-of-way limits, or restrict drainage.

5.3-1

All embankment and waste material shall be compacted. The minimum acceptable compaction is achieved by placing embankments in 2 foot or shallower lifts and routing excavation equipment over entire width of the lifts. Side hill embankments too narrow to accommodate excavation equipment may be placed by end-dumping or side casting until sufficiently wide to support the equipment.

5.4-1

Silt-bearing runoff shall not be permitted to go into streams.

5.4-2

Accomplish sediment removal through silt traps, silt fences, settling ponds, or other methods as approved, in writing, by the Contract Administrator.

5.4-3.2

<On the following road<s>, Purchaser shall evenly spread the hydroseed erosion mixture listed below on all soil exposed during the current construction season. The time of application shall be within one month of final approval for haul.

Mixture by Weight/Acre
4000 lbs of water
1800 lbs of wood fiber mulch
400 lbs of fertilizer (16-16-16)
80 lbs of seed (50% Red Fescue, 25% Perennial Ryegrass, 15% Bentgrass, 10% Clover)*
54 lbs of silvafiber tachifier, or equal to

*Mixture of seed are by percent weight of the total quantity of the seed.

ROAD PLAN

SALE NAME: Tower

ROAD PLAN DATE: 03/30/2004

Road	Stations
PH-3701	0+00 to 16+99
PH-3700	MP .24 to 11+25

5.5-5

Finished subgrade shall be crowned as shown on the TYPICAL SECTION SHEET, and shall be uniform, firm, rut-free, and shaped to ensure surface runoff in an even, unconcentrated manner.

SECTION 6 - DRAINAGE

6.2.1-1

Purchaser shall furnish, install, and maintain galvanized culverts meeting AASHTO M-36 or corrugated polyethylene pipe meeting AASHTO specification No. M-294-S as designated on the CULVERT LIST. Culvert and flume lengths shall be varied to fit as-built conditions subject to written approval by the Contract Administrator. Refer to Hydraulic Project Approval/s for applicable culvert installations.

6.2.1-2

Annular corrugated bands and culvert ends shall be used on metal culverts. On culverts 24 inches and smaller, bands shall have a minimum width of 12 inches; on culverts over 24 inches, bands shall have a minimum width of 24 inches. Manufacturer's approved connectors shall be used for corrugated polyethylene pipe.

6.2.2.1-1

Culvert, downspout, flume, and energy dissipator installation shall be in accordance with CULVERT AND DRAINAGE SPECIFICATION DETAIL. Touch up damaged galvanized coating with 2 coats of zinc rich paint.

6.2.2.3-1

Cross drains and surface culverts on road grades in excess of 3% shall be skewed at least 30 degrees from perpendicular to the road centerline , except that cross drain culverts at the low points of dips in roads shall not be skewed.

6.2.2.3-2

Cross drain culverts shall be installed at a slope steeper than the incoming ditch grade, but not less than 3% nor more than 10%.

6.2.2.5-1

Drainage structure outfalls shall not terminate directly on unprotected soil that will erode. Downspouts, flumes, and energy dissipators shall be installed to prevent erosion.

6.3-1

Ditches shall be constructed concurrently with construction of the subgrade. Ditches shall drain to culverts, ditchouts, and natural drainages.

6.3-2

On the following roads, shaping the ditchline, culvert headwalls, and catch basins shall be completed prior to application of rock and shall be done in accordance with the TYPICAL SECTION SHEET and CULVERT AND DRAINAGE SPECIFICATION DETAIL.

Road	Stations
PH-3700	MP 0.00 to 0.24

ROAD PLAN

SALE NAME: Tower

ROAD PLAN DATE: 03/30/2004

6.5-1

Headwalls shall be constructed in accordance with CULVERT AND DRAINAGE SPECIFICATION DETAIL at all cross drain culverts except for temporary culverts.

SECTION 7 - ROCK

7.1-1

Rock used under this contract may be obtained from the following source/s on State land as listed below at no charge to the Purchaser.

Source	Location	Rock Type
PH-3000 pit	Section 20 (6-2E)	Ballast

7.1-5

Use of rock sources not listed in this section is subject to written approval from the contract administrator.

7.2-1

All pit operations shall be performed as directed by the contract administrator and in accordance with the Pit Development and Reclamation Plan/s.

7.2.1-1

Rock shall meet the following specifications for gradation when placed on the subgrade:

No more than 10% of the rock shall be larger than 8 inches in any dimension and no rock shall be larger than 12 inches in any dimension.

7.2.3-1

Measurement of rock shall be on a cubic yard truck measure basis. The Purchaser shall provide and maintain load tally sheets for each truck and shall give them to the Contract Administrator upon request.

7.2.4-1

Rock drilling and shooting shall meet the following specifications:

a. Oversize material remaining in the rock source at the conclusion of the timber sale shall not exceed 5 percent of the total volume mined for the sale.

b. Oversize material is defined as rock fragments larger than two feet in any dimension.

7.4.2-1

Apply at least the minimum required rock quantity as shown on ROCK LIST.

7.4.2-8

Each lift of rock shall be crowned as shown on TYPICAL SECTION SHEET, and shall be uniform, firm, rut-free, and shaped to ensure surface runoff in an even, unconcentrated manner.

7.4.3-2A

Rock shall be spread and compacted full width. Compaction shall be by vibratory Elliot grid weighing at least 20,000 pounds. At least four complete passes at a maximum speed of 10 mph shall be made on each lift.

ROAD PLAN

SALE NAME: Tower

ROAD PLAN DATE: 03/30/2004

SECTION 9 - ROAD AND LANDING CLOSURES

9.2-1

Purchaser shall reduce or relocate landing debris, in a manner approved by the Contract Administrator, to avoid landing failures and potential debris slides.

ROADENG Plan

F:\PROJECTS\ROADDE~1\TOWER\RADIOA~1\RADIO

Scale 1:1200

1" = 100'

P. 1

04/03/24

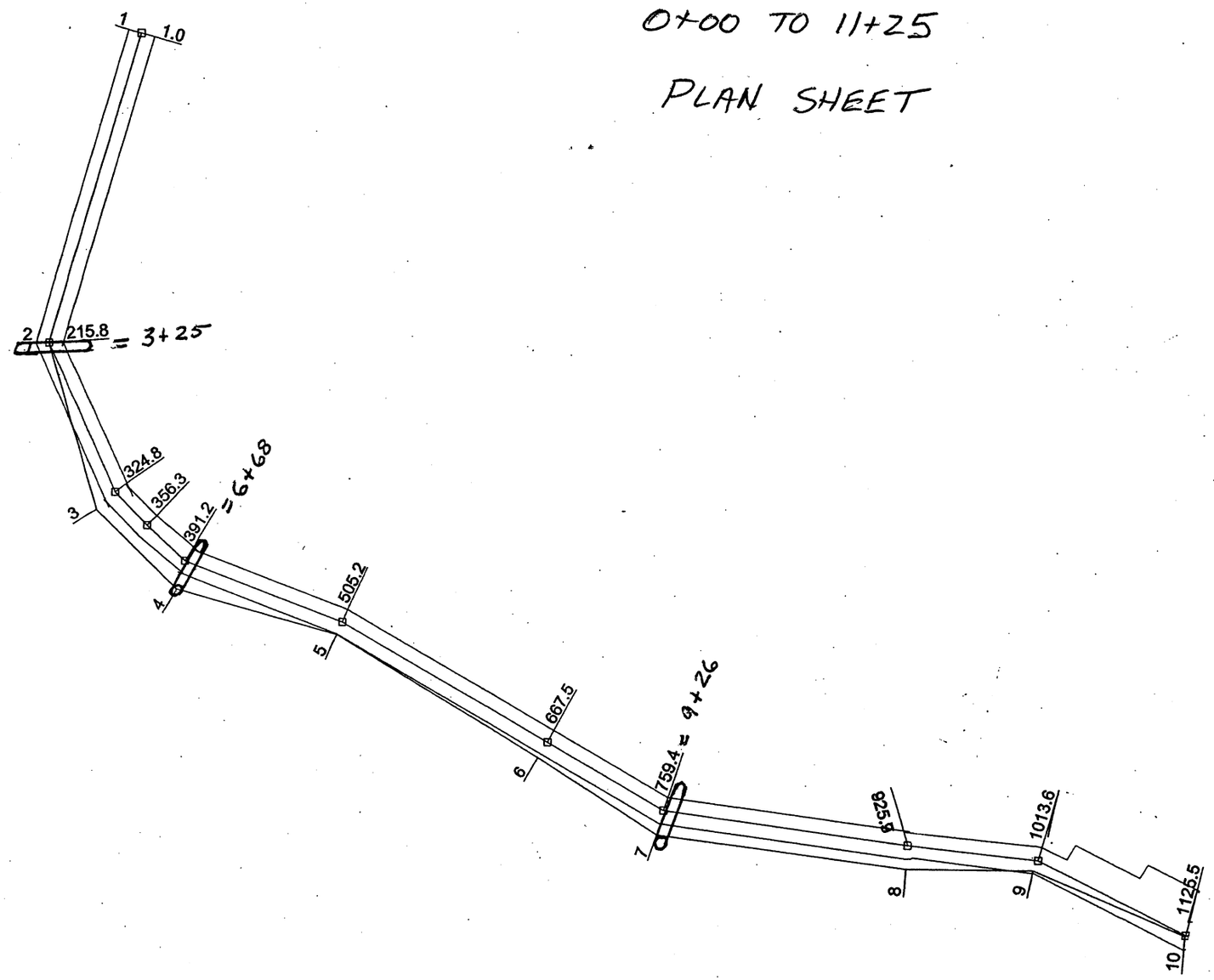
3/30/04

TOWER TBS # 76209

SHEET 9 OF 30

PH-3700 ROAD
0+00 TO 11+25

PLAN SHEET



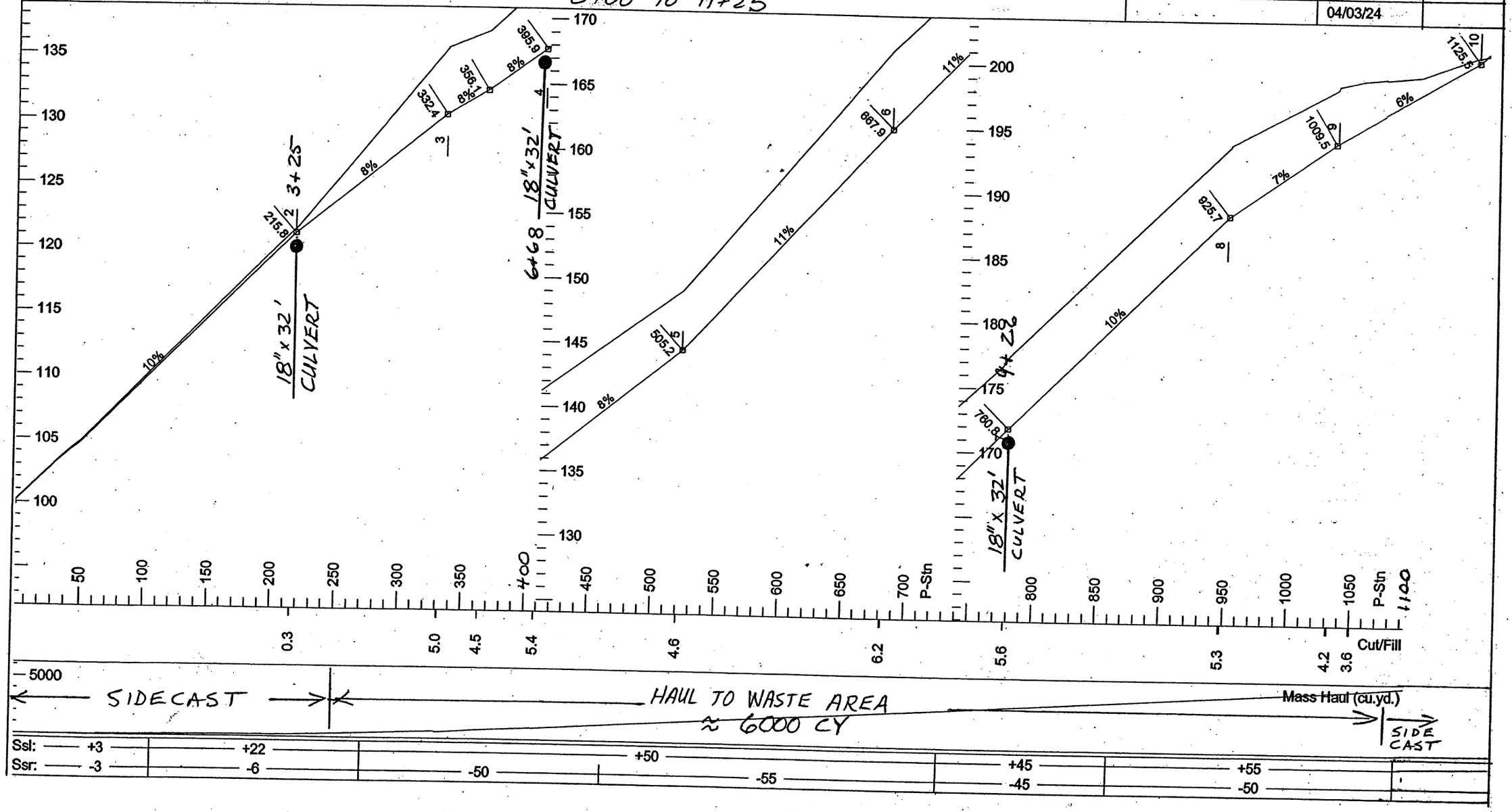
ROADENG Profile

F:\PROJECTS\ROADDE~1\TOWER\RADIOA~1\RADIO

PH-3700 PROFILE SHEET
0+00 TO 11+25

P. 1

04/03/24



3/30/04

TOWER TBS #76209

SHEET 10 OF 30

ROADENG Section

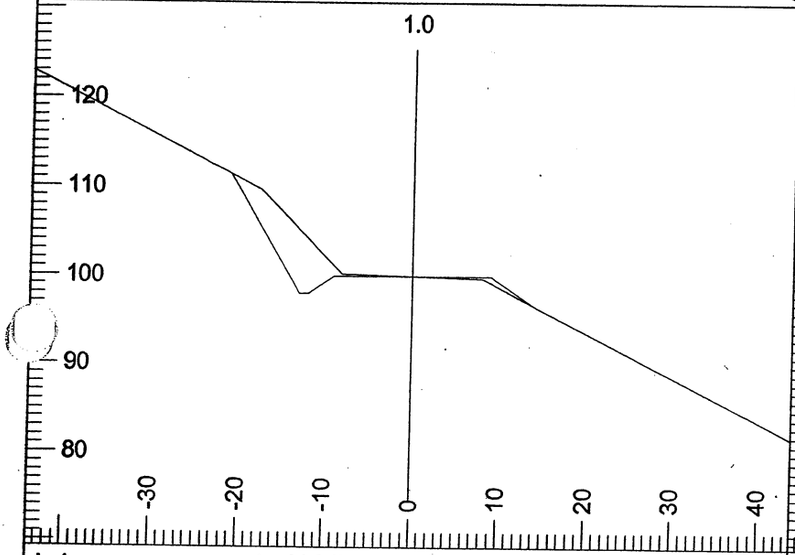
D:\ROADDE~1\GREENM~1\TOWER\RADIOA~1\RADIO

PH-3700 CROSS SECTION
0400 TO 11+25

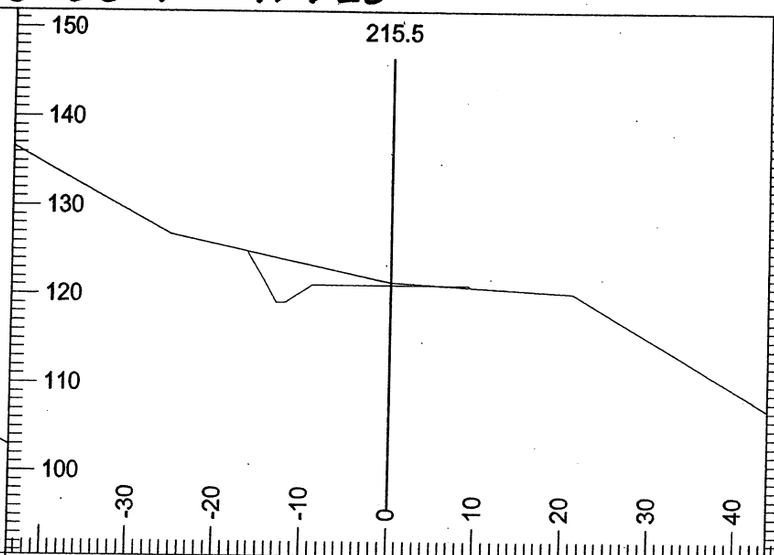
Scale 1:240

P. 1

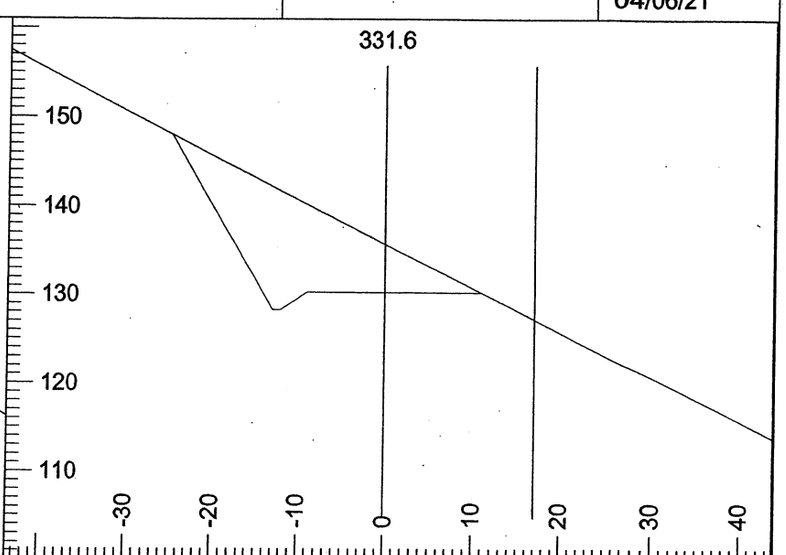
04/06/21



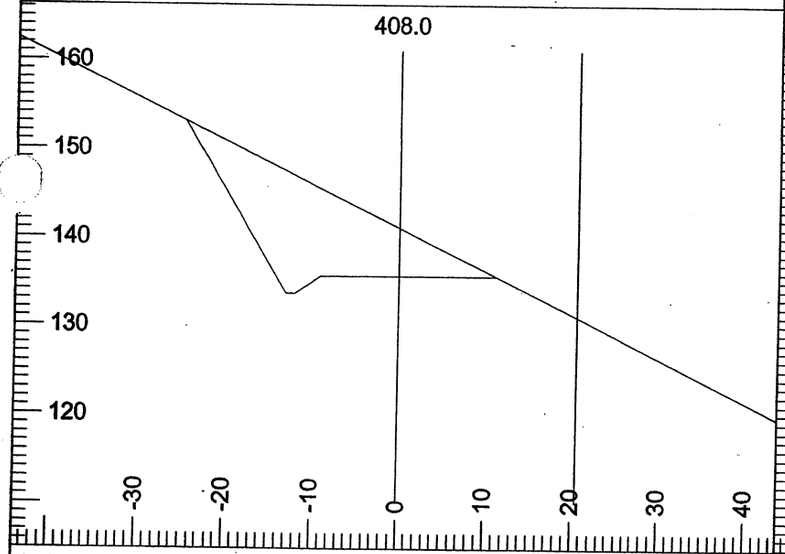
Index:	1	V.Offset:	-0.0	Ssl:	3.0
P-Stn:	1.0	Grd.Nxt %:	9.9	Ssr:	-3.0
H. Offset:	0.0	Grd.Lst %:	n/a		



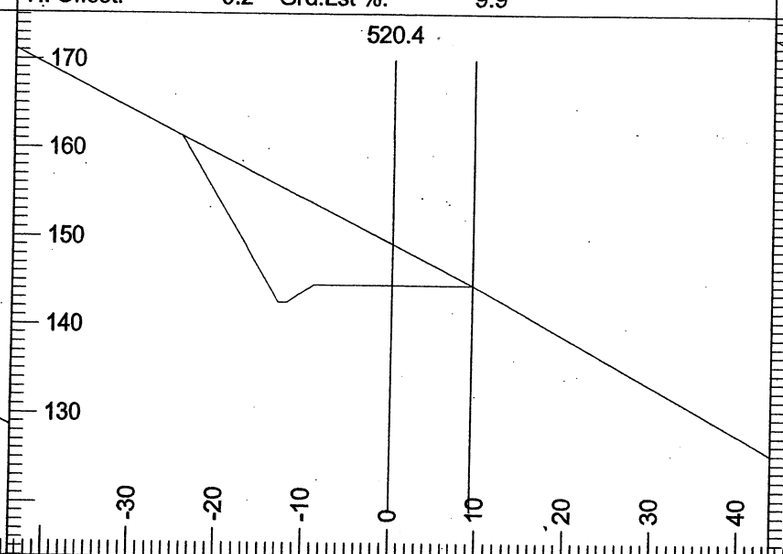
Index:	2	V.Offset:	-0.3	Ssl:	22.0
P-Stn:	215.5	Grd.Nxt %:	9.9	Ssr:	-6.0
H. Offset:	-0.2	Grd.Lst %:	9.9		



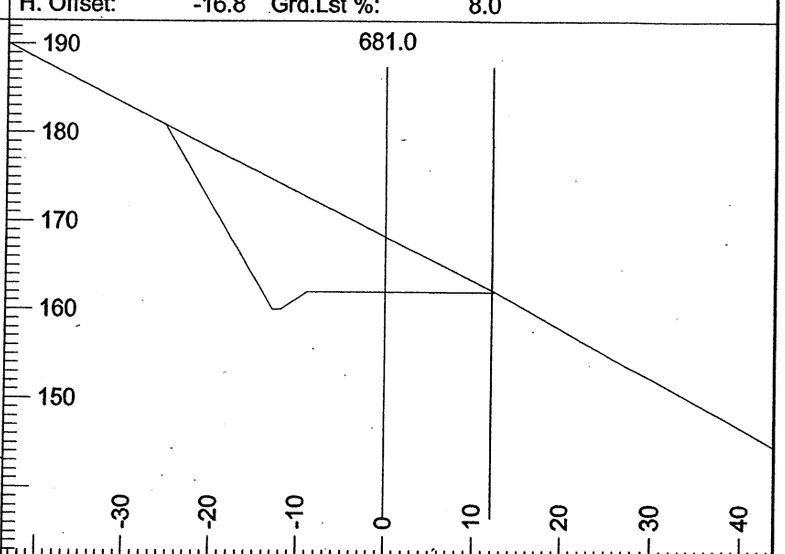
Index:	3	V.Offset:	3.0	Ssl:	50.0
P-Stn:	331.6	Grd.Nxt %:	8.0	Ssr:	-50.0
H. Offset:	-16.8	Grd.Lst %:	8.0		



Index:	4	V.Offset:	4.6	Ssl:	50.0
P-Stn:	408.0	Grd.Nxt %:	8.2	Ssr:	-50.0
H. Offset:	-20.0	Grd.Lst %:	8.1		



Index:	5	V.Offset:	0.0	Ssl:	50.0
P-Stn:	520.4	Grd.Nxt %:	10.8	Ssr:	-55.0
H. Offset:	-9.3	Grd.Lst %:	8.2		



Index:	6	V.Offset:	-0.2	Ssl:	50.0
P-Stn:	681.0	Grd.Nxt %:	10.8	Ssr:	-55.0
H. Offset:	-11.9	Grd.Lst %:	10.8		

ROADENG Section

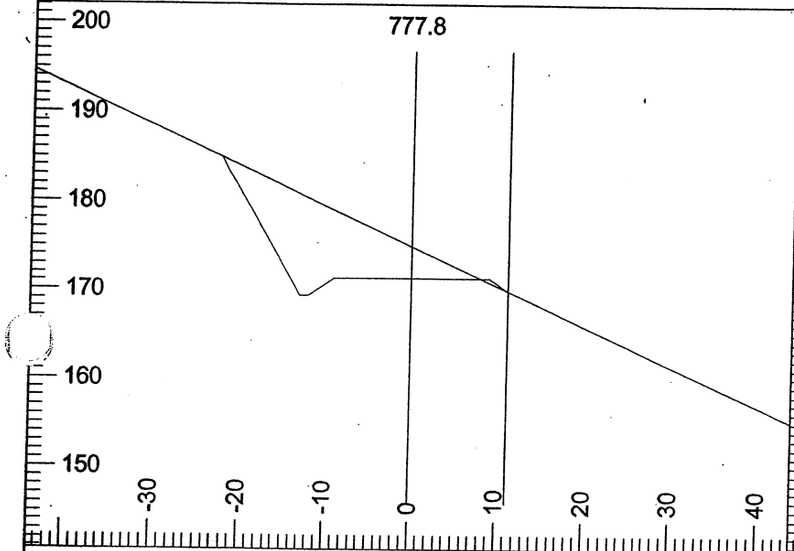
PH-3700 CROSS SECTIONS

Scale 1:240

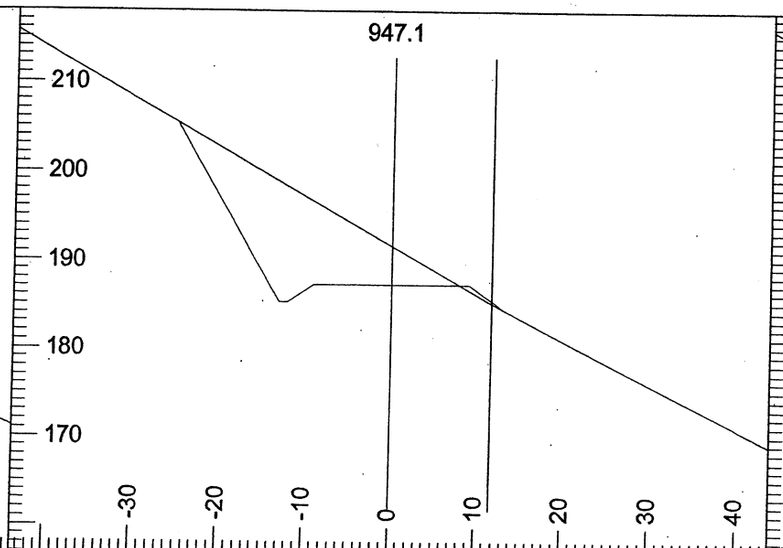
P. 2

D:\ROADDE~1\GREENM~1\TOWER\RADIOA~1\RADIO

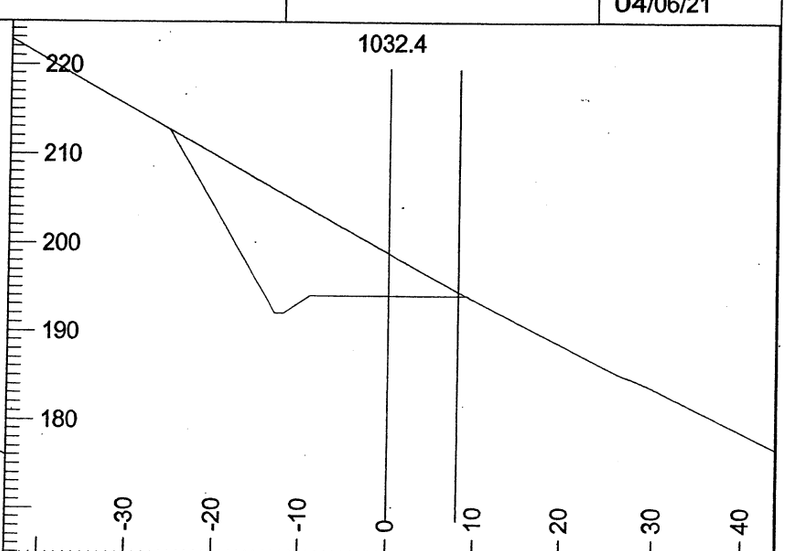
04/06/21



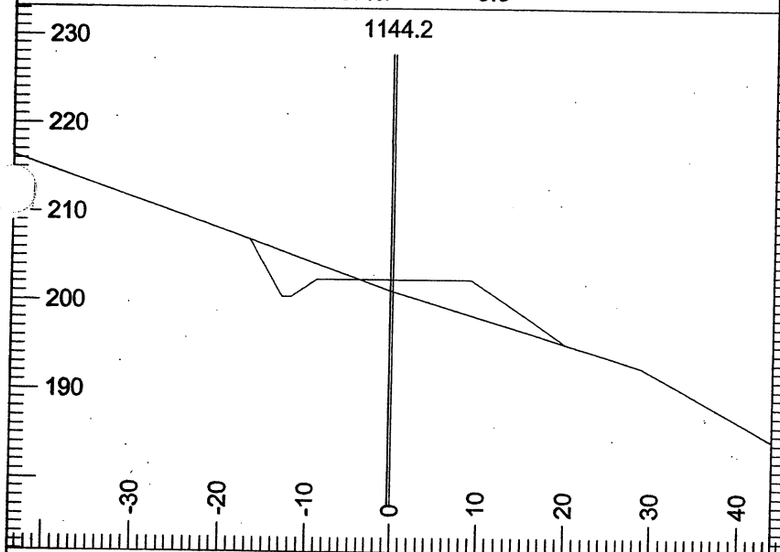
Index:	7	V.Offset:	1.4	Ssl:	45.0
P-Stn:	777.8	Grd.Nxt %:	9.6	Ssr:	-45.0
H. Offset:	-11.1	Grd.Lst %:	9.6		



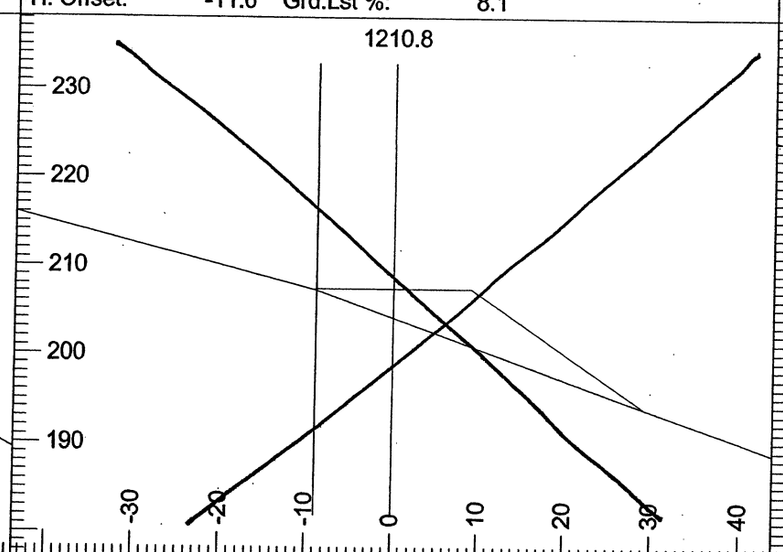
Index:	8	V.Offset:	2.0	Ssl:	55.0
P-Stn:	947.1	Grd.Nxt %:	8.1	Ssr:	-50.0
H. Offset:	-11.6	Grd.Lst %:	8.1		



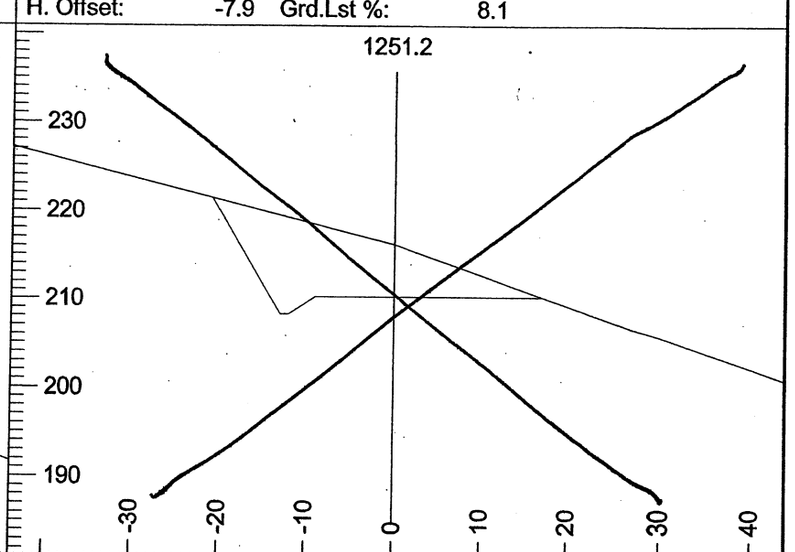
Index:	9	V.Offset:	-0.5	Ssl:	55.0
P-Stn:	1032.4	Grd.Nxt %:	8.1	Ssr:	-50.0
H. Offset:	-7.9	Grd.Lst %:	8.1		



Index:	10	V.Offset:	1.2	Ssl:	35.0
P-Stn:	1144.2	Grd.Nxt %:	7.1	Ssr:	-30.0
H. Offset:	0.3	Grd.Lst %:	7.1		



Index:	11	V.Offset:	0.2	Ssl:	25.0
P-Stn:	1210.8	Grd.Nxt %:	6.5	Ssr:	-35.0
H. Offset:	8.8	Grd.Lst %:	6.5		



Index:	12	V.Offset:	-5.9	Ssl:	25.0
P-Stn:	1251.2	Grd.Nxt %:	6.5	Ssr:	-35.0
H. Offset:	0.0	Grd.Lst %:	6.5		

ROADENG Plan

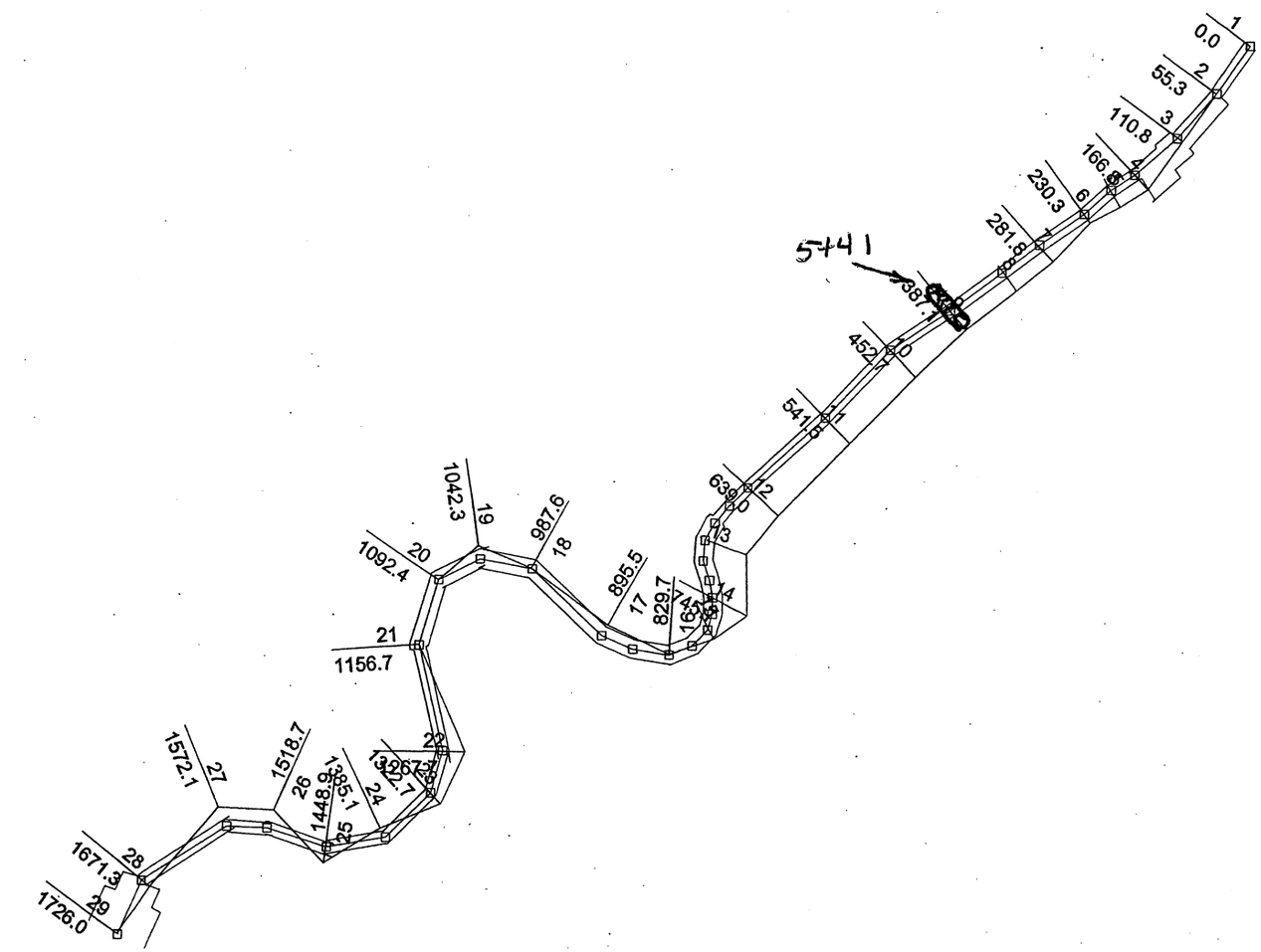
PLAN SHEET

D:\ROADDE~1\GREENM~1\TOWER\TOWER\TOWER_A PH 3701

Scale 1:2000

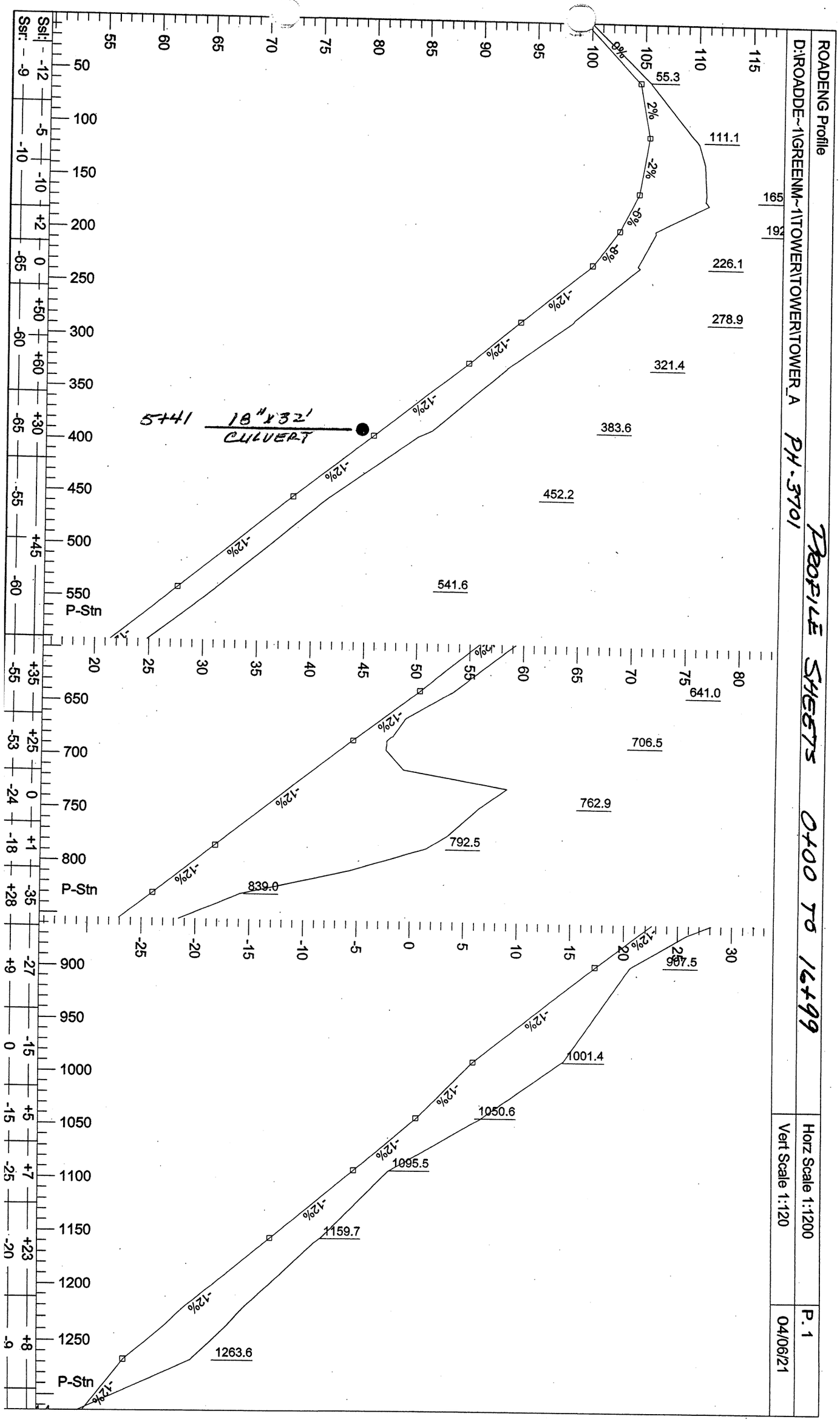
P. 1

04/06/21



5441

Page 13 of 30


ROADENG Profile
D:\ROADDE~1\GREENM~1\TOWER\TOWER\TOWER_A
PH-3701
PROFILE SHEETS 0400 TO 1699
Horz Scale 1:1200
Vert Scale 1:120
P. 1
04/06/21
5+41 18"x32' CULVERT
55.3
111.1
165
192
226.1
278.9
321.4
383.6
452.2
541.6
641.0
706.5
762.9
792.5
839.0
907.5
1001.4
1050.6
1095.5
1159.7
1263.6
P-Stn

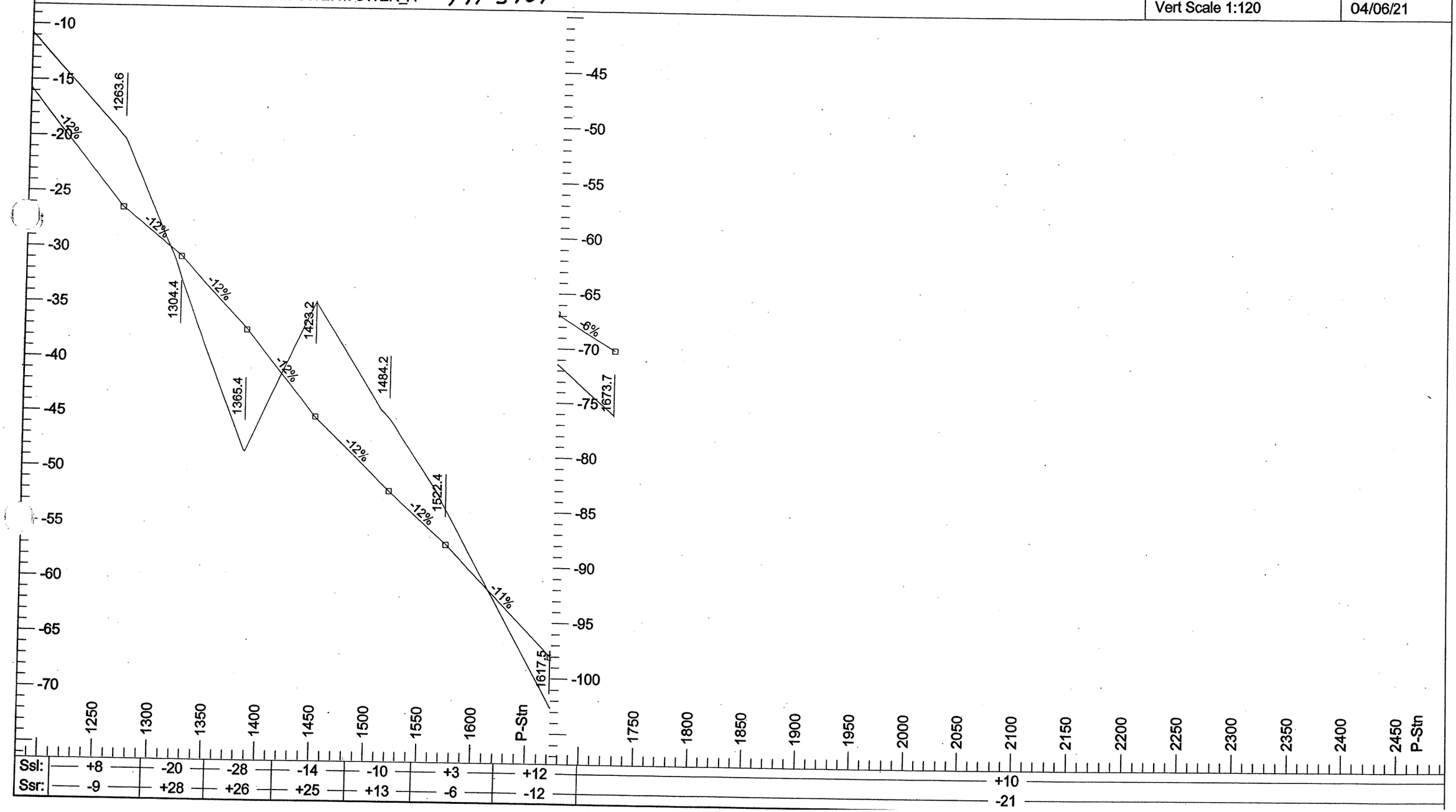
ROADENG Profile

D:\ROADDE~1\GREENM~1\TOWER\TOWER\TOWER_A

PROFILE SHEETS

PH 3701

Horz Scale 1:1200	P. 2
Vert Scale 1:120	04/06/21



Page 15 of 30

ROADENG Section

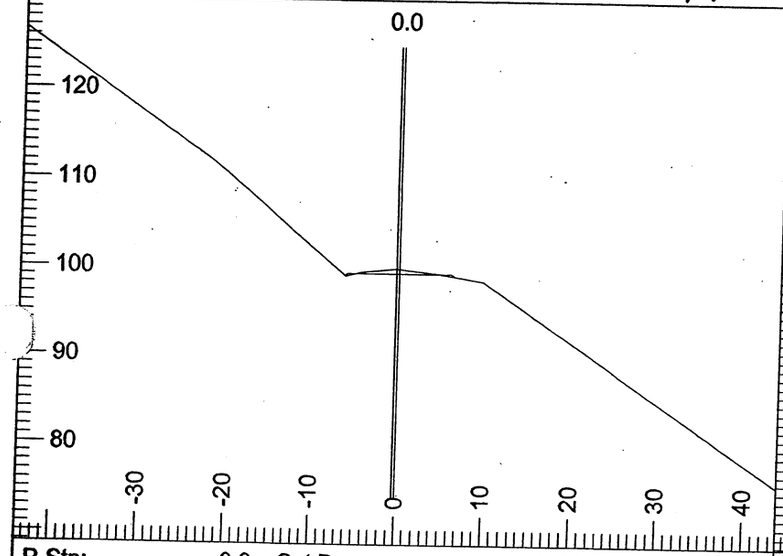
PROFILE SHEETS

D:\ROADDE~1\GREENM~1\TOWER\TOWER\TOWER_A PH 3701

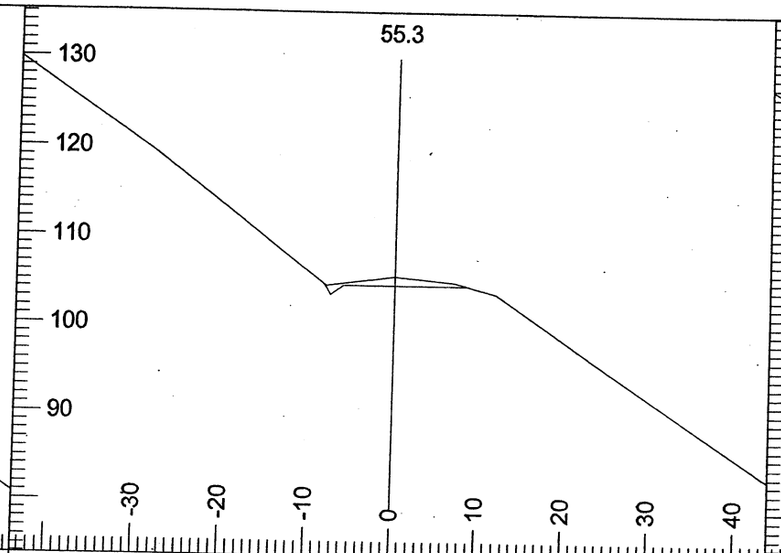
Scale 1:240

P. 1

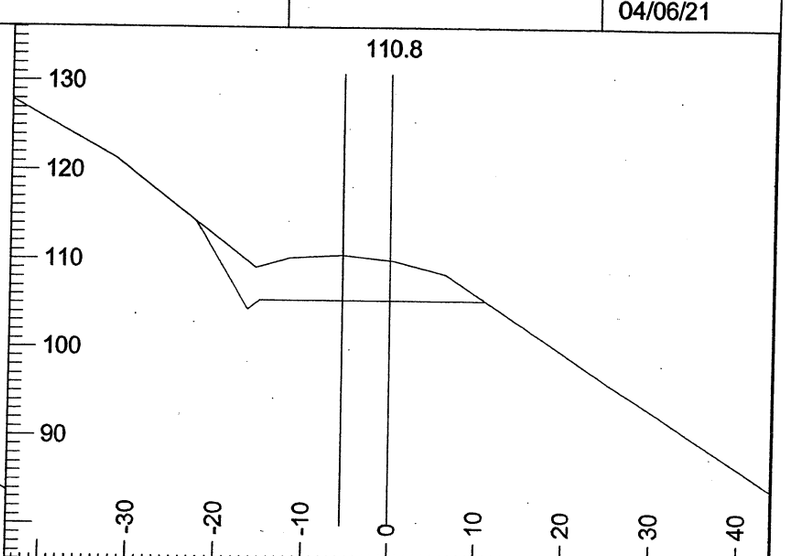
04/06/21



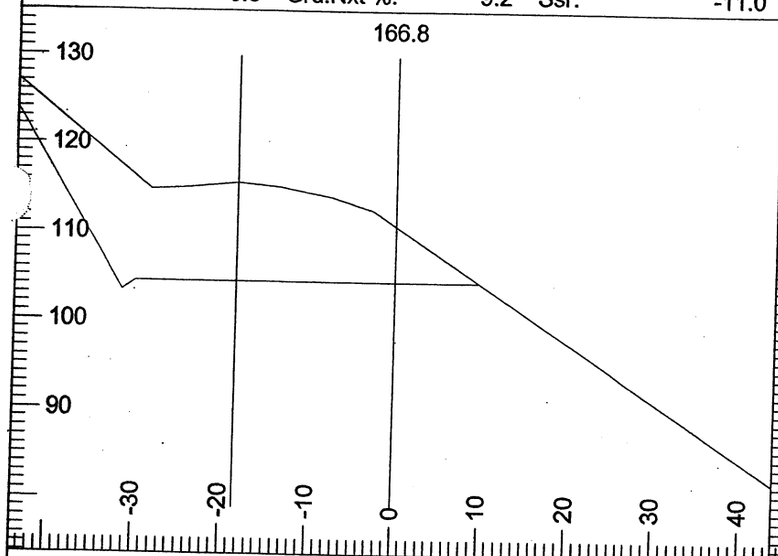
P-Stn:	0.0	Cut Dp:	0.6	Grd.Lst %:	n/a
Index:	1	V.Offset:	-0.6	Ssl:	-10.0
H. Offset:	0.3	Grd.Nxt %:	9.2	Ssr:	-11.0



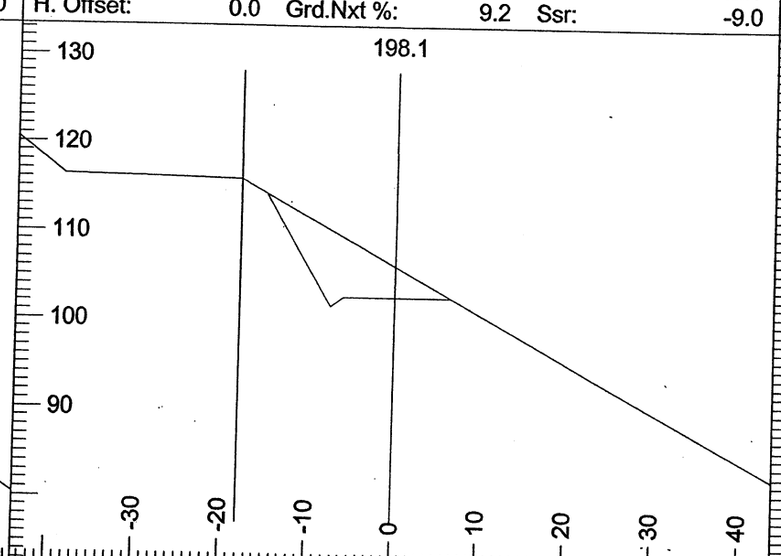
P-Stn:	55.3	Cut Dp:	1.0	Grd.Lst %:	9.2
Index:	2	V.Offset:	-1.0	Ssl:	-12.0
H. Offset:	0.0	Grd.Nxt %:	9.2	Ssr:	-9.0



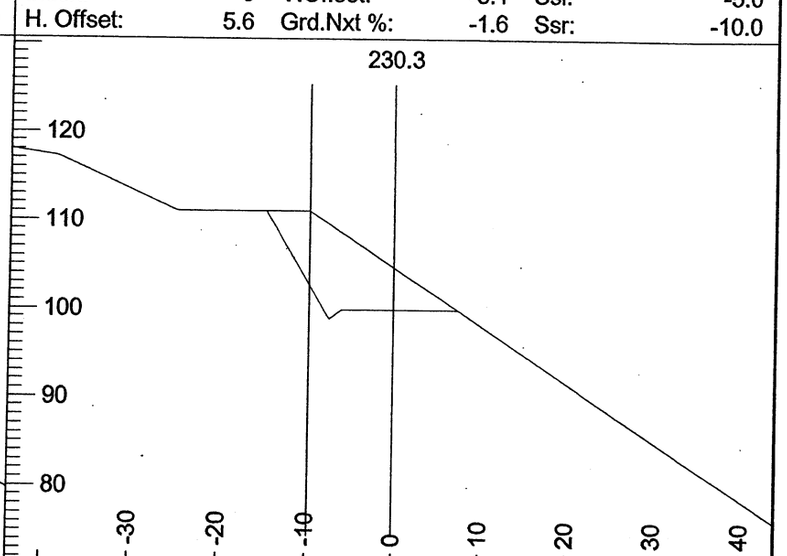
P-Stn:	110.8	Cut Dp:	4.5	Grd.Lst %:	-1.6
Index:	3	V.Offset:	-5.1	Ssl:	-5.0
H. Offset:	5.6	Grd.Nxt %:	-1.6	Ssr:	-10.0



P-Stn:	166.8	Cut Dp:	6.3	Grd.Lst %:	-6.4
Index:	4	V.Offset:	-11.1	Ssl:	-10.0
H. Offset:	18.4	Grd.Nxt %:	-6.4	Ssr:	-10.0



P-Stn:	198.1	Cut Dp:	3.5	Grd.Lst %:	-7.6
Index:	5	V.Offset:	-13.2	Ssl:	2.0
H. Offset:	17.7	Grd.Nxt %:	-7.6	Ssr:	-55.0



P-Stn:	230.3	Cut Dp:	4.8	Grd.Lst %:	-11.9
Index:	6	V.Offset:	-11.1	Ssl:	0.0
H. Offset:	9.7	Grd.Nxt %:	-11.9	Ssr:	-65.0

ROADENG Section

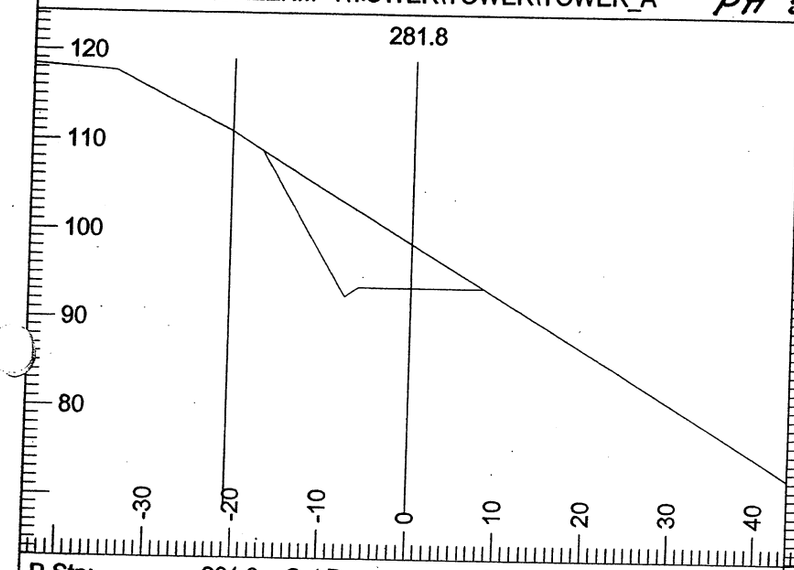
PROFILE SHEETS

D:\ROADDE~1\GREENM~1\TOWER\TOWER\TOWER_A PH 3701

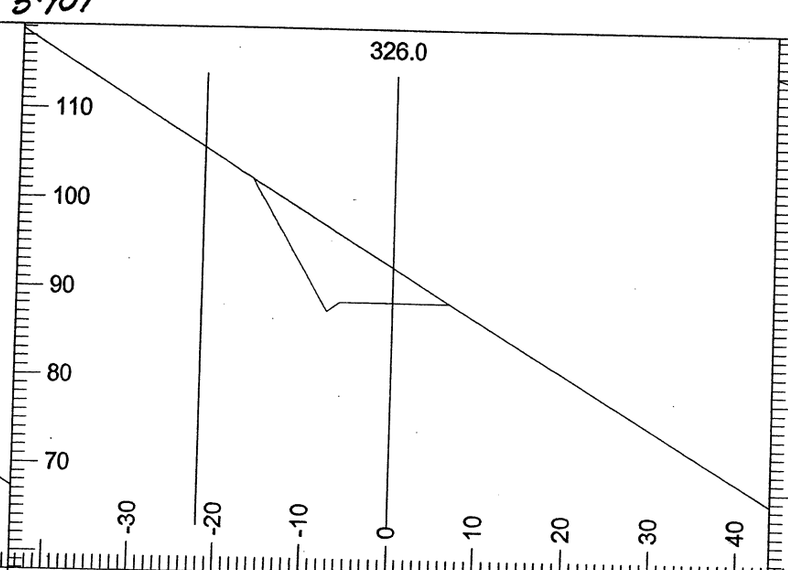
Scale 1:240

P. 2

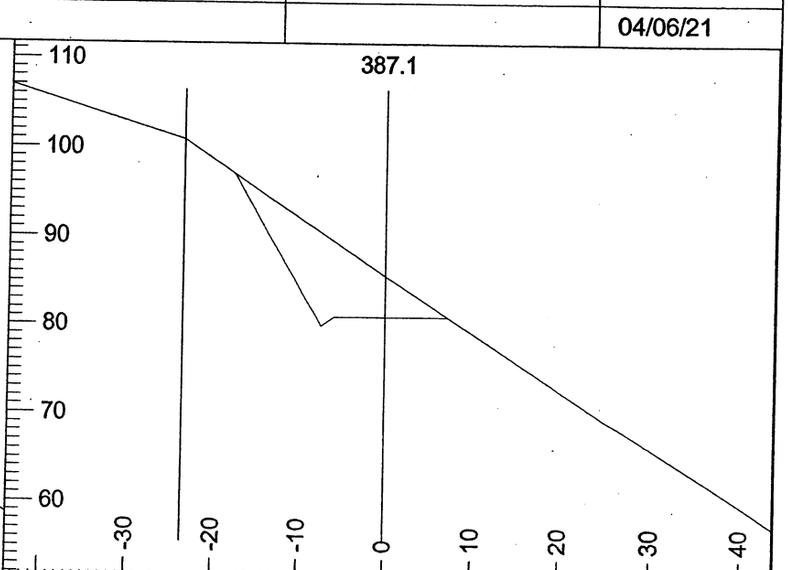
04/06/21



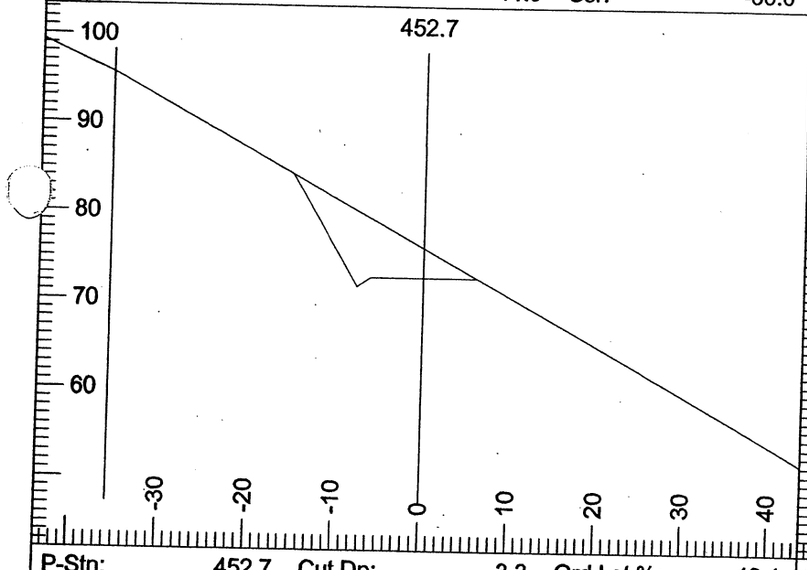
P-Stn:	281.8	Cut Dp:	5.0	Grd.Lst %:	-11.9
Index:	7	V.Offset:	-17.4	Ssl:	50.0
H. Offset:	20.7	Grd.Nxt %:	-11.9	Ssr:	-60.0



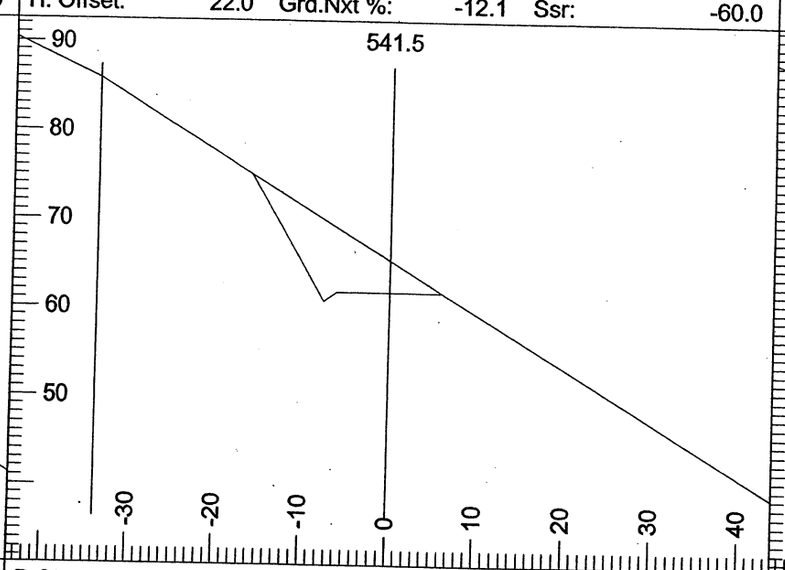
P-Stn:	326.0	Cut Dp:	4.0	Grd.Lst %:	-12.1
Index:	8	V.Offset:	-17.2	Ssl:	60.0
H. Offset:	22.0	Grd.Nxt %:	-12.1	Ssr:	-60.0



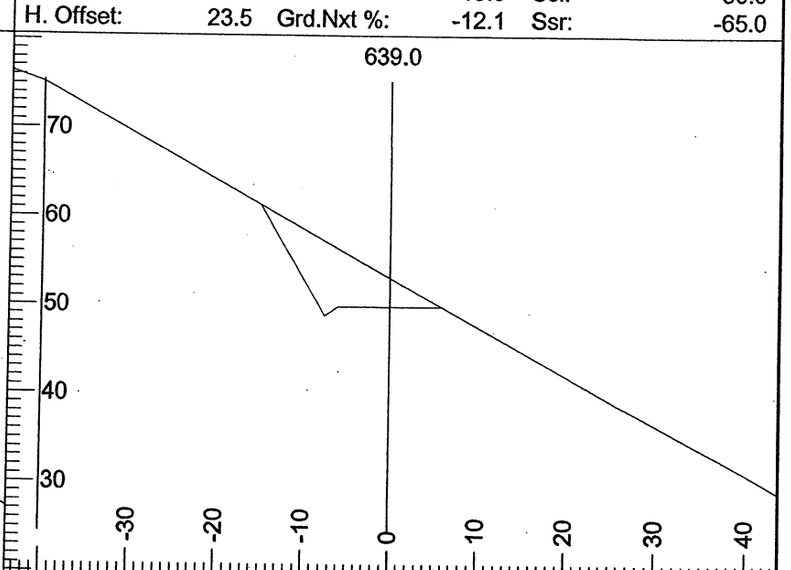
P-Stn:	387.1	Cut Dp:	4.6	Grd.Lst %:	-12.1
Index:	9	V.Offset:	-19.9	Ssl:	30.0
H. Offset:	23.5	Grd.Nxt %:	-12.1	Ssr:	-65.0



P-Stn:	452.7	Cut Dp:	3.3	Grd.Lst %:	-12.1
Index:	10	V.Offset:	-22.9	Ssl:	45.0
H. Offset:	35.5	Grd.Nxt %:	-12.1	Ssr:	-55.0



P-Stn:	541.5	Cut Dp:	3.6	Grd.Lst %:	-12.1
Index:	11	V.Offset:	-23.9	Ssl:	45.0
H. Offset:	33.8	Grd.Nxt %:	-12.1	Ssr:	-60.0



P-Stn:	639.0	Cut Dp:	3.2	Grd.Lst %:	-12.2
Index:	12	V.Offset:	-25.2	Ssl:	35.0
H. Offset:	39.9	Grd.Nxt %:	-12.2	Ssr:	-55.0

Page 17 of 30

ROADENG Section

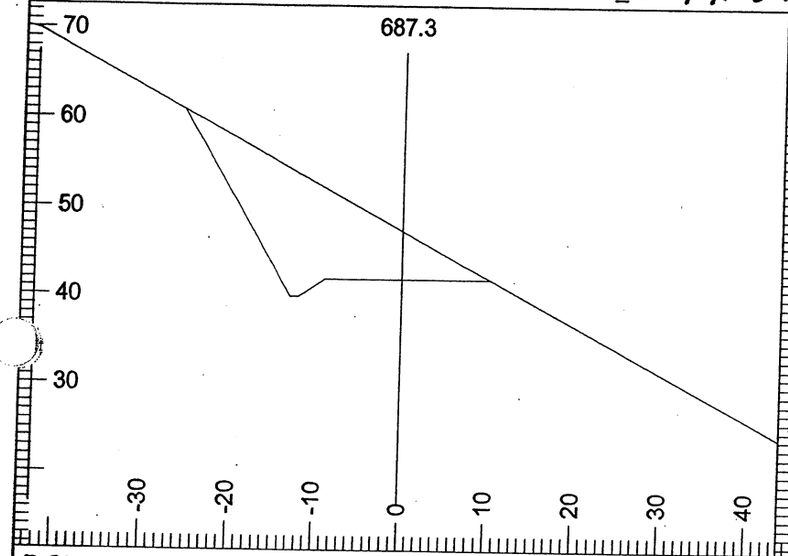
PROPILE SHEETS

D:\ROADDE~1\GREENM~1\TOWER\TOWER\TOWER_A PH 3701

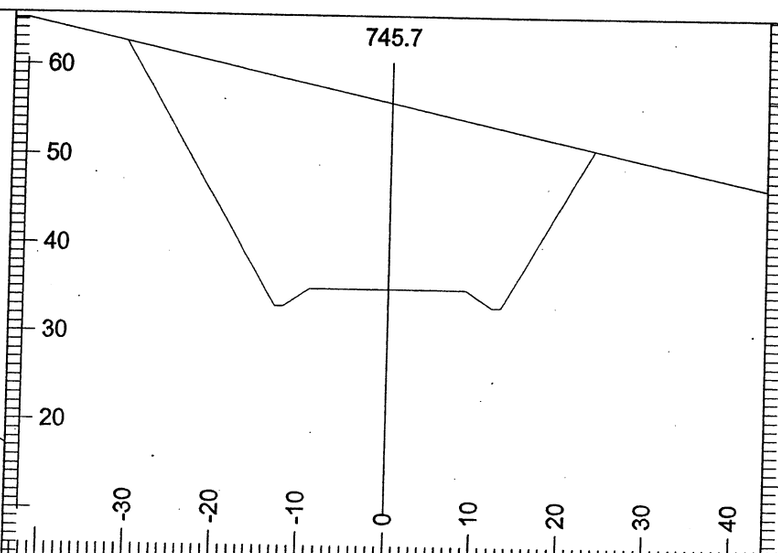
Scale 1:240

P. 3

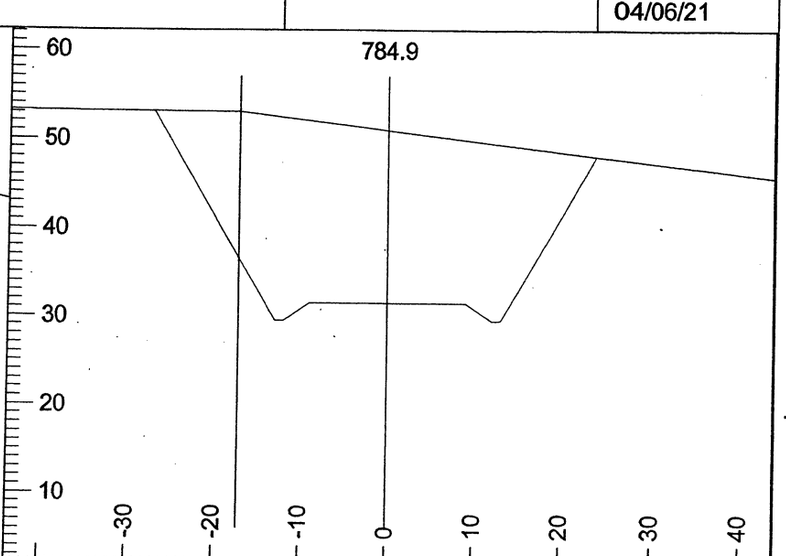
04/06/21



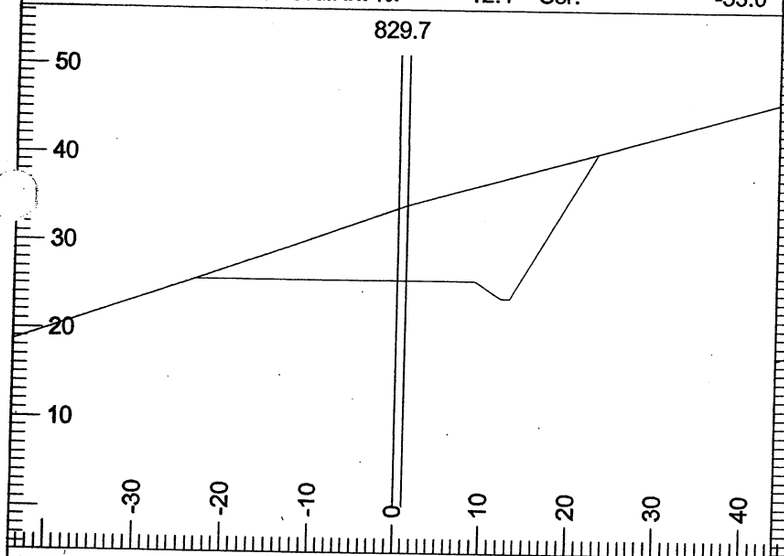
P-Stn:	687.3	Cut Dp:	5.4	Grd.Lst %:	-12.1
Index:	13	V.Offset:	-27.9	Ssl:	25.0
H. Offset:	42.3	Grd.Nxt %:	-12.1	Ssr:	-53.0



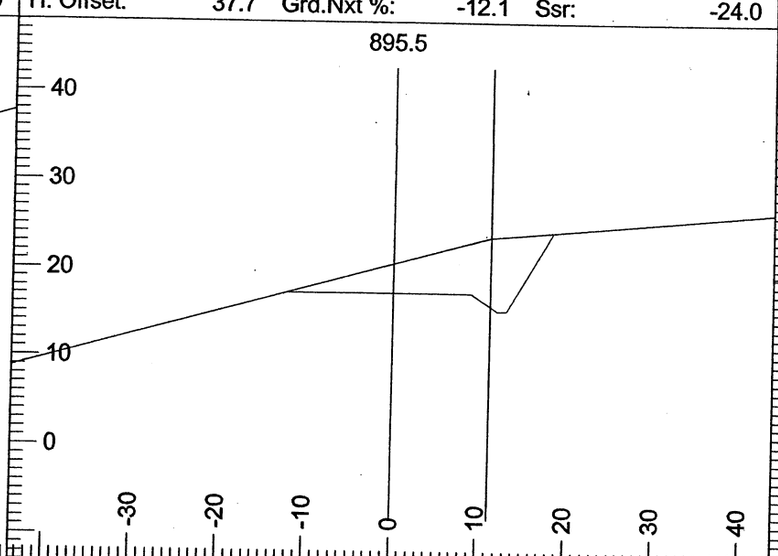
P-Stn:	745.7	Cut Dp:	21.0	Grd.Lst %:	-12.1
Index:	14	V.Offset:	-30.0	Ssl:	0.0
H. Offset:	37.7	Grd.Nxt %:	-12.1	Ssr:	-24.0



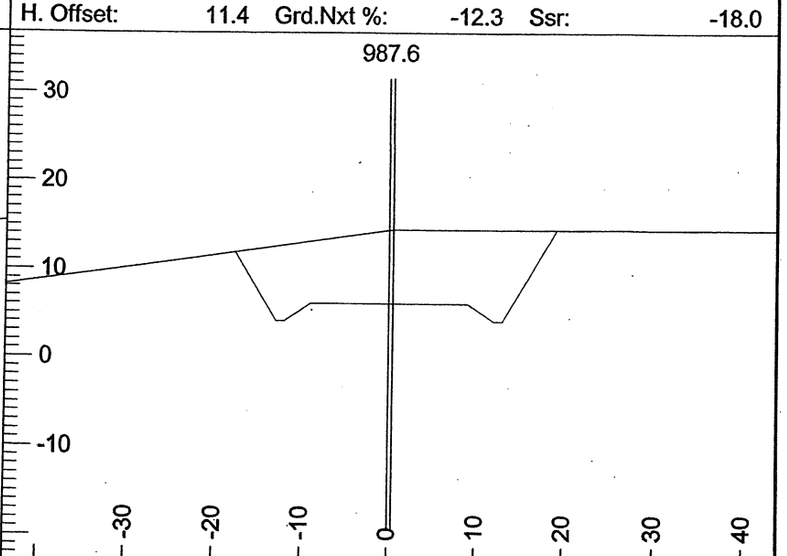
P-Stn:	784.9	Cut Dp:	19.4	Grd.Lst %:	-12.3
Index:	15	V.Offset:	-21.5	Ssl:	1.0
H. Offset:	11.4	Grd.Nxt %:	-12.3	Ssr:	-18.0



P-Stn:	829.7	Cut Dp:	8.0	Grd.Lst %:	-12.3
Index:	16	V.Offset:	-8.4	Ssl:	-35.0
H. Offset:	-1.0	Grd.Nxt %:	-12.3	Ssr:	28.0



P-Stn:	895.5	Cut Dp:	3.2	Grd.Lst %:	-12.3
Index:	17	V.Offset:	-6.3	Ssl:	-27.0
H. Offset:	-11.2	Grd.Nxt %:	-12.0	Ssr:	9.0



P-Stn:	987.6	Cut Dp:	8.3	Grd.Lst %:	-12.0
Index:	18	V.Offset:	-8.3	Ssl:	-15.0
H. Offset:	-0.4	Grd.Nxt %:	-12.0	Ssr:	0.0

ROADENG Section

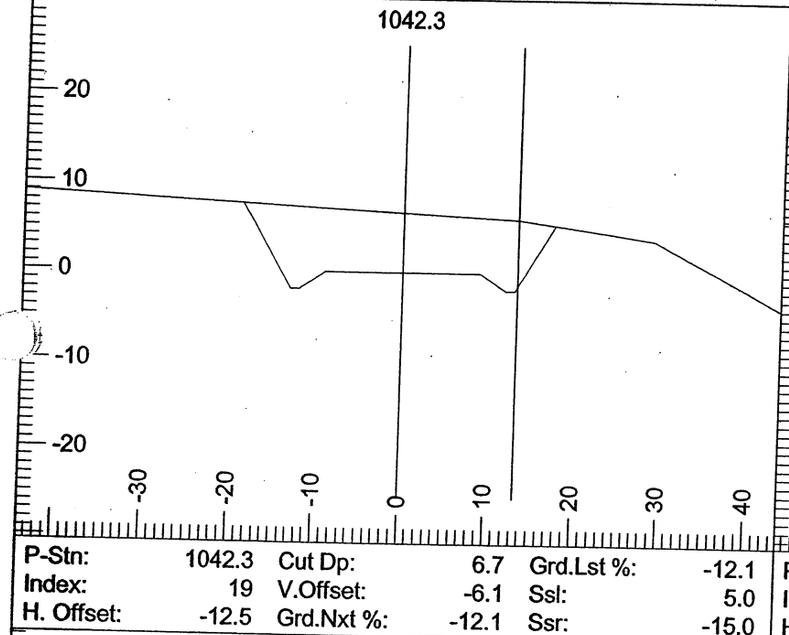
PROFILE SHEETS

D:\ROADDE~1\GREENM~1\TOWER\TOWER\TOWER_A PH 3701

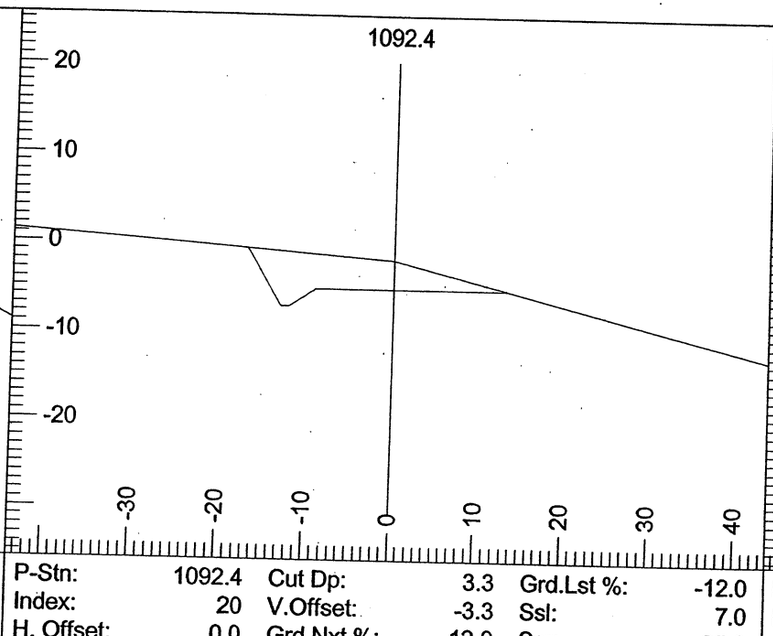
Scale 1:240

P. 4

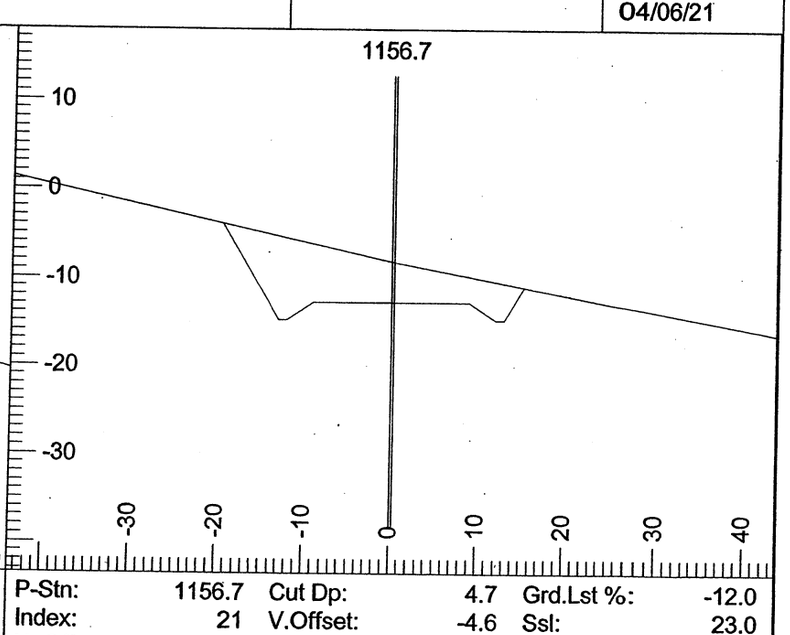
04/06/21



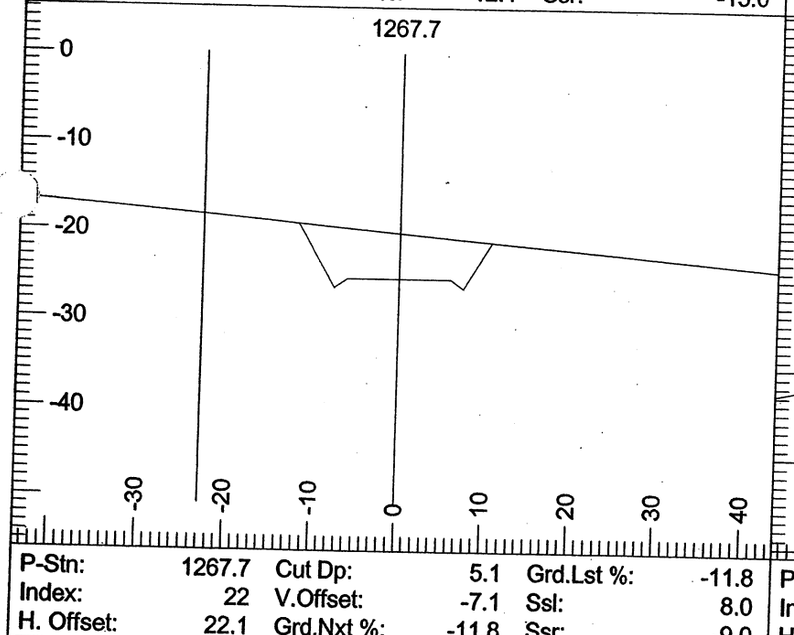
P-Stn:	1042.3	Cut Dp:	6.7	Grd.Lst %:	-12.1
Index:	19	V.Offset:	-6.1	Ssl:	5.0
H. Offset:	-12.5	Grd.Nxt %:	-12.1	Ssr:	-15.0



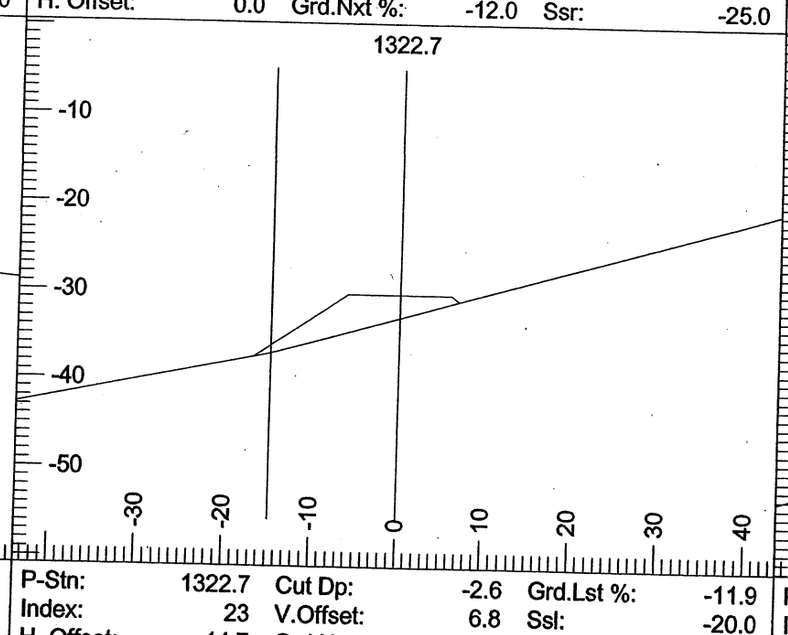
P-Stn:	1092.4	Cut Dp:	3.3	Grd.Lst %:	-12.0
Index:	20	V.Offset:	-3.3	Ssl:	7.0
H. Offset:	0.0	Grd.Nxt %:	-12.0	Ssr:	-25.0



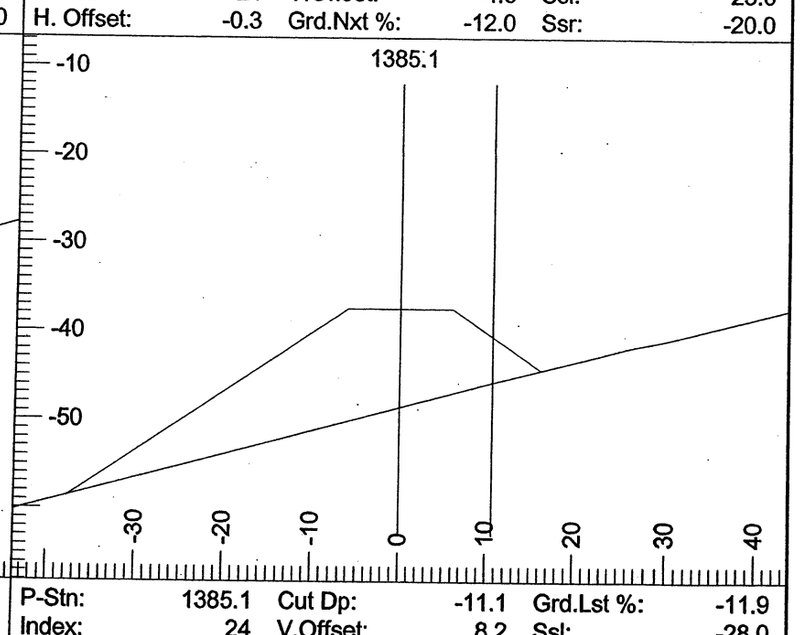
P-Stn:	1156.7	Cut Dp:	4.7	Grd.Lst %:	-12.0
Index:	21	V.Offset:	-4.6	Ssl:	23.0
H. Offset:	-0.3	Grd.Nxt %:	-12.0	Ssr:	-20.0



P-Stn:	1267.7	Cut Dp:	5.1	Grd.Lst %:	-11.8
Index:	22	V.Offset:	-7.1	Ssl:	8.0
H. Offset:	22.1	Grd.Nxt %:	-11.8	Ssr:	-9.0



P-Stn:	1322.7	Cut Dp:	-2.6	Grd.Lst %:	-11.9
Index:	23	V.Offset:	6.8	Ssl:	-20.0
H. Offset:	14.7	Grd.Nxt %:	-11.9	Ssr:	28.0



P-Stn:	1385.1	Cut Dp:	-11.1	Grd.Lst %:	-11.9
Index:	24	V.Offset:	8.2	Ssl:	-28.0
H. Offset:	-10.1	Grd.Nxt %:	-11.9	Ssr:	26.0

Page 19 of 30

ROADENG Section

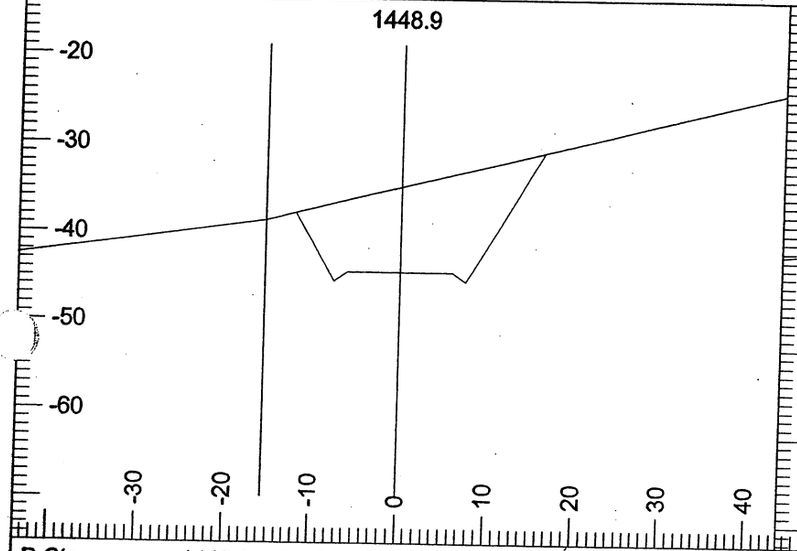
PROFILE SHEETS

D:\ROADDE~1\GREENM~1\TOWER\TOWER\TOWER_A PH 3701

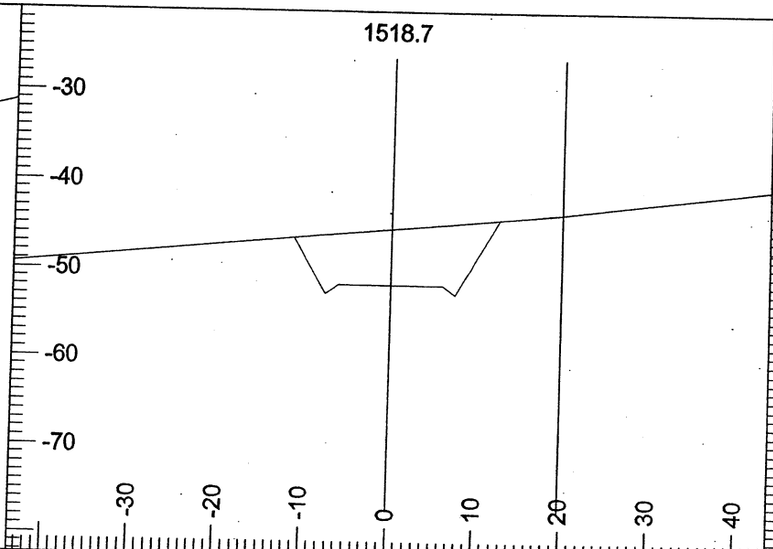
Scale 1:240

P. 5

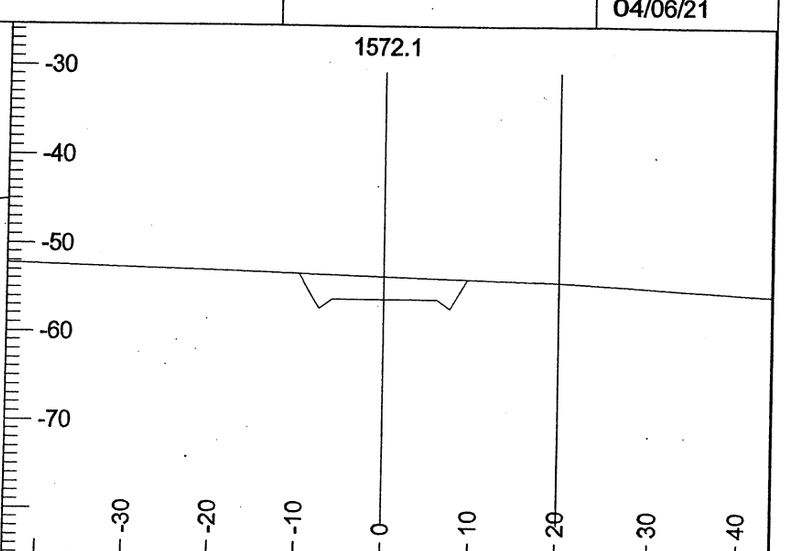
04/06/21



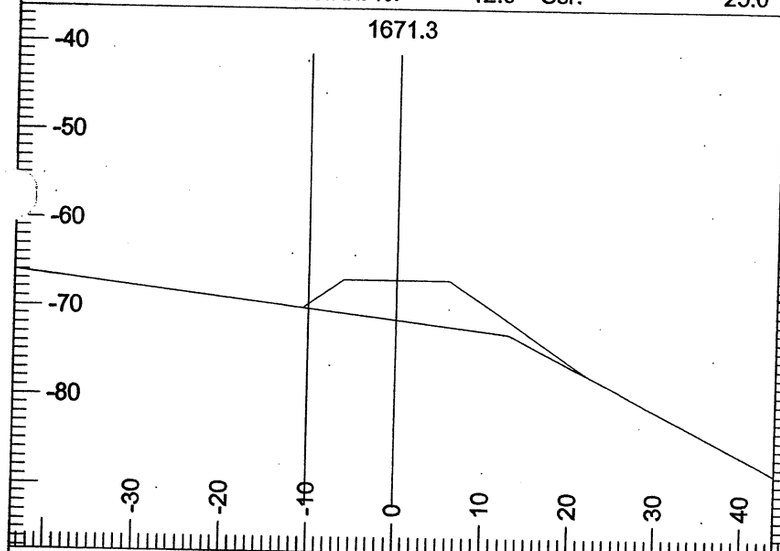
P-Stn:	1448.9	Cut Dp:	9.5	Grd.Lst %:	-12.0
Index:	25	V.Offset:	-5.7	Ssl:	-14.0
H. Offset:	15.3	Grd.Nxt %:	-12.0	Ssr:	25.0



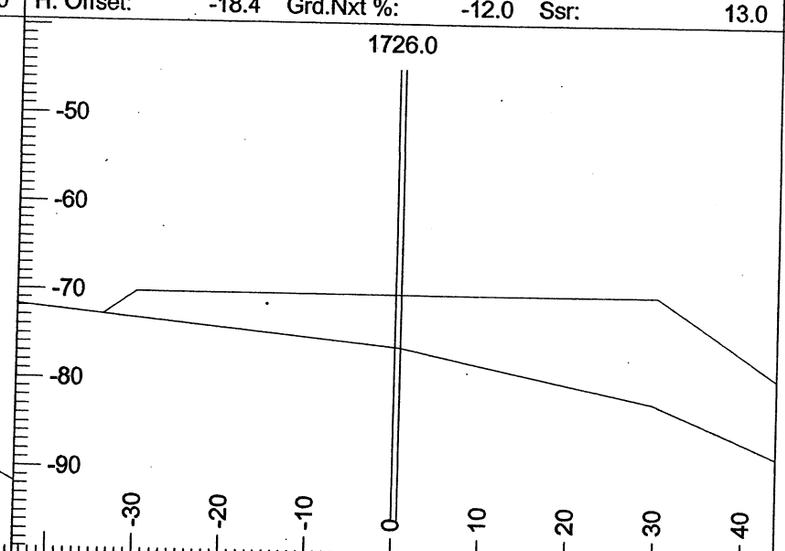
P-Stn:	1518.7	Cut Dp:	6.3	Grd.Lst %:	-12.0
Index:	26	V.Offset:	-8.1	Ssl:	-10.0
H. Offset:	-18.4	Grd.Nxt %:	-12.0	Ssr:	13.0



P-Stn:	1572.1	Cut Dp:	2.5	Grd.Lst %:	-11.7
Index:	27	V.Offset:	-1.9	Ssl:	3.0
H. Offset:	-19.7	Grd.Nxt %:	-11.7	Ssr:	-6.0



P-Stn:	1671.3	Cut Dp:	-4.5	Grd.Lst %:	-11.1
Index:	28	V.Offset:	3.3	Ssl:	12.0
H. Offset:	10.1	Grd.Nxt %:	-11.1	Ssr:	-12.0



P-Stn:	1726.0	Cut Dp:	-5.9	Grd.Lst %:	-5.9
Index:	29	V.Offset:	6.0	Ssl:	10.0
H. Offset:	-0.6	Grd.Nxt %:	n/a	Ssr:	-21.0

Page 20 of 30

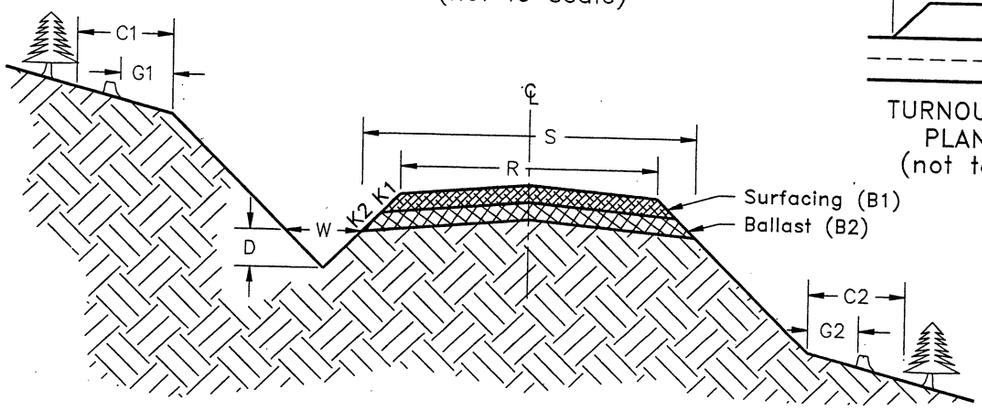
STATE OF WASHINGTON
DEPARTMENT OF NATURAL RESOURCES

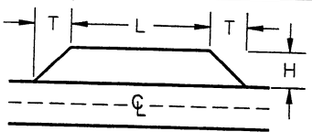
ROAD PLAN

SALE NAME: Tower

ROAD PLAN DATE: 03/30/2004

ROAD CROSS-SECTION
(not to scale)





TURNOUT DETAIL
PLAN VIEW
(not to scale)

TYPICAL SECTION SHEET

Road Number	From Station	To Station	Tolerance Class	Subgrade Width	Road Width	Ditch		Crown in. @ CL	Grubbing Limits		Clearing Limits	
						Width	Depth					
				S	R	W	D		G1	G2	C1	C2
PH-3700	MP 0.00	MP 0.24		18'	12'	3'	1'	4"	2'	2'	—	—
PH-3700	0+00	11+25		18'	12'	3'	1'	4"	2'	2'	10'	10'
PH-3701	0+00	16+99		18'	12'	3'	1'	4"	2'	2'	10'	10'
PH-3000	MP 0.00	MP 0.35		18'	12'	3'	1'	4"	2'	2'	10'	10'

Contract Number: 76209

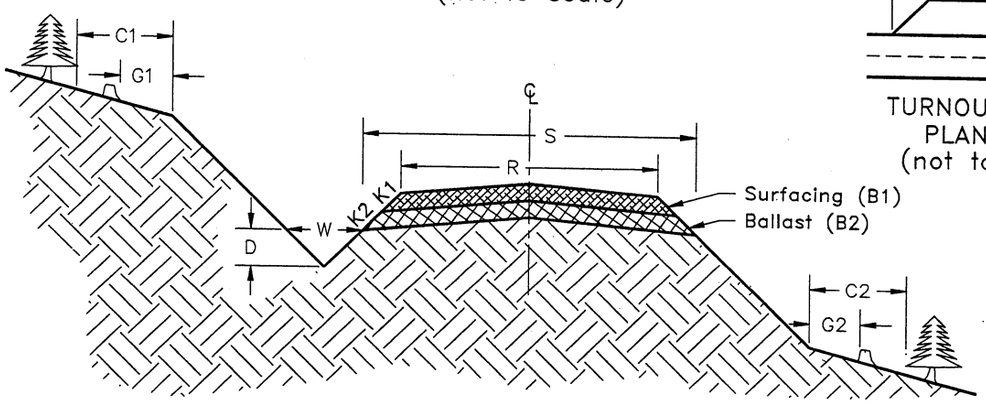
STATE OF WASHINGTON
DEPARTMENT OF NATURAL RESOURCES

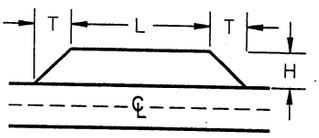
ROAD PLAN

SALE NAME: Tower

ROAD PLAN DATE: 03/30/2004

ROAD CROSS-SECTION
(not to scale)





TURNOUT DETAIL
PLAN VIEW
(not to scale)

ROCK LIST

BALLAST

Road Number	From Station	To Station	Rock Slope	Rock Depth	C.Y./ Station	# of Stations	C.Y. Subtotal	Rock Source	Turnout		
									Length	Width	Taper
			K2	B2					L	H	T
PH-3700	MP 0.00	MP 0.24	Patch	Rock			400	1.			
PH-3700	0+00	11+25		18"	84	11.25	945	1.			
	T.O.			18"	84	1	84	1.			
PH-3701	0+00	16+99		18"	84	16.99	1427	1.	50'	12'	50'
	T.O.s			18"	84	2	168	1.			
Landings					75	4	300	1.	50'	12'	50'
PH-3000	MP 0.00	Mp 0.35	Patch	Rock			100	1.			

BALLAST TOTAL 3424 Cubic Yards

SURFACING

Road Number	From Station	To Station	Rock Slope	Rock Depth	C.Y./ Station	# of Stations	C.Y. Total	Rock Source
			K1	B1				

SURFACE TOTAL _____ Cubic Yards

STATE OF WASHINGTON
DEPARTMENT OF NATURAL RESOURCES

ROAD PLAN

SALE NAME: Tower

ROAD PLAN DATE: 03/30/2004

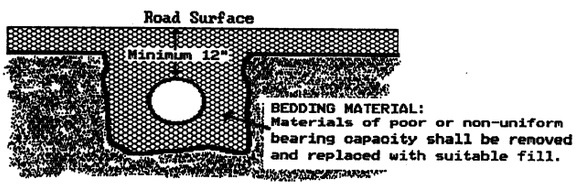
CULVERT LIST

Road Number	Location	Culvert Dia.	Culvert Gauge	Length (ft) Culvert	Length (ft) Downspt	Length (ft) Flume	Riprap (C.Y.) Inlet	Riprap (C.Y.) Outlet	Riprap (C.Y.) Type	Backfill Material	Placement Method	Remarks
			If									
			Steel									
PH-3700	2+16	18"	16	32'								
	3+91	18"	16	32'								
	7+59	18"	16	32'								
PH-3701	5+41	18"	16	32'		20'						

Key:

SR - Shot Rock
NT - Native (bank run)
SL - Select Fill
HL - Heavy Loose Riprap
LL - Light Loose Riprap
Flume - Half round pipe
Downspout - Full round pipe

CULVERT BACKFILL AND BASE PREPARATION
(For culverts less than 36")



STATE OF WASHINGTON
DEPARTMENT OF NATURAL RESOURCES

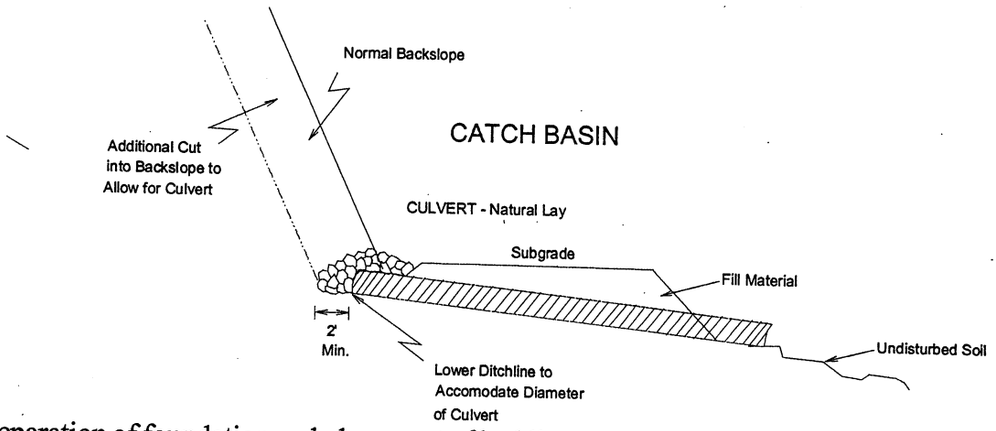
ROAD PLAN

SALE NAME: Tower

ROAD PLAN DATE: 03/30/2004

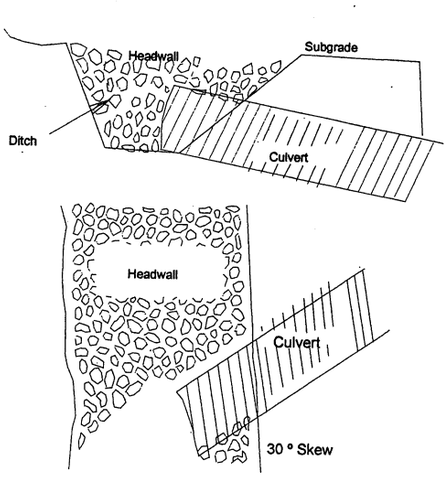
CULVERT AND DRAINAGE SPECIFICATION DETAIL

(Page 1 of 2)



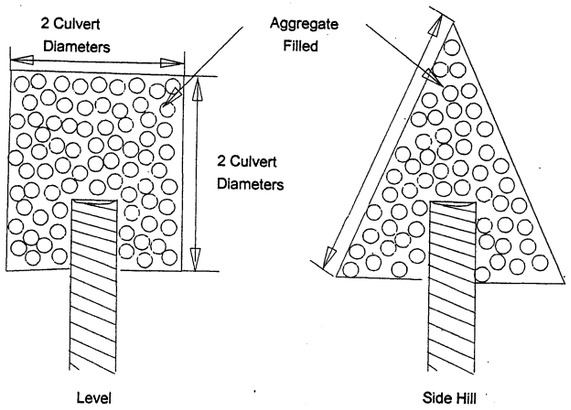
Proper preparation of foundation and placement of bedding material shall precede the installation of all culvert pipe. This includes necessary leveling of the native trench bottom and compaction of required bedding material to form a uniform dense unyielding base. The backfill material shall be placed so that the pipe is uniformly supported along the barrel.

HEADWALLS



Headwalls to be constructed of material that will resist erosion.

ENERGY



Dissipator Specifications:
Depth: 1 culvert diameter
Aggregate: as specified in the CULVERT LIST.

STATE OF WASHINGTON
DEPARTMENT OF NATURAL RESOURCES

ROAD PLAN

SALE NAME: Tower

ROAD PLAN DATE: 03/30/2004

CULVERT AND DRAINAGE SPECIFICATION DETAIL

(Page 2 of 2)

POLYETHYLENE PIPE INSTALLATION

INSTALLATION REQUIREMENTS:

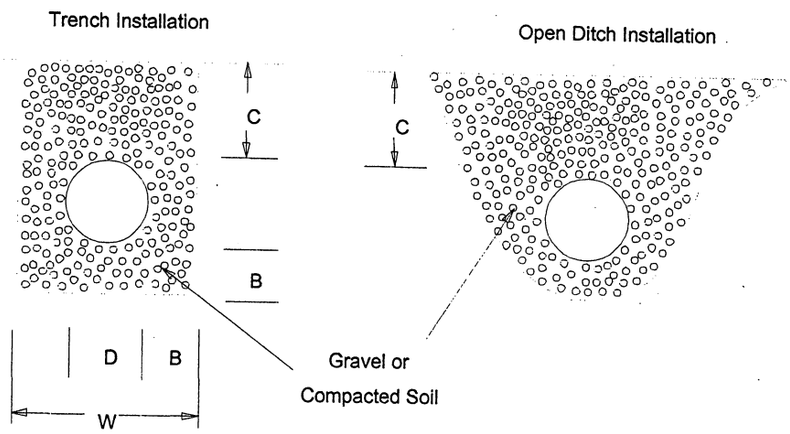
1. Crushed stone, gravel, or compacted soil backfill material shall be used as the bedding and envelope material around the culvert. The aggregate size shall not exceed 1/6 pipe diameter or 4" diameter, whichever is smaller.

2. The corrugated pipe shall be laid on grade, on a layer of bedding material as shown for the two types of installations. If native soil is used as the bedding and backfill material, it shall be well compacted in six inch layers under the haunches, around the sides and above the pipe to the recommended minimum height of cover.

3. Either crushed aggregate or flexible (asphalt) pavement may be laid as part of the minimum cover requirements.

4. Site conditions and availability of bedding materials often dictate the type of installation method used.

5. The load bearing capability of flexible conduits is dependent on the type of backfill material used and the degree of compaction achieved. Crushed stone and gravel backfill materials typically reach a compaction level of 90-95% AASHTO standard density without compaction. When native soils are used as backfill material, a compaction level of 85% is required. This minimum compaction can be achieved by either hand or mechanical tamping.



MINIMUM DIMENSIONS
Trench or Open Ditch Installation

Nominal Diameter	Minimum Thickness	Minimum Cover	Min. Trench Width
D	B	C	W
18"	6"	12"	36"
24"	6"	12"	42"
30"	6"	12"	48"
36"	6"	12"	54"

STATE OF WASHINGTON
DEPARTMENT OF NATURAL RESOURCES

ROAD PLAN

SALE NAME: Tower

ROAD PLAN DATE: 03/30/2004

FOREST ACCESS ROAD MAINTENANCE SPECIFICATIONS

1. CONSTRUCTION AND RECONSTRUCTION (Prior to acceptance to the contract or acceptance on a timber sale).

A. Cuts and Fills
   1. Maintain slope lines as constructed. Remove slides from the ditches and roadway. Replace fills to 11/2:1 slopes with selected material or as directed. Remove overhanging material from the cut slopes.
   2. Material from slides or other sources requiring removal shall not be deposited in streams or at locations where it will erode into streams or water courses.
   3. Undesirable slide materials and debris shall not be mixed into the surface material.

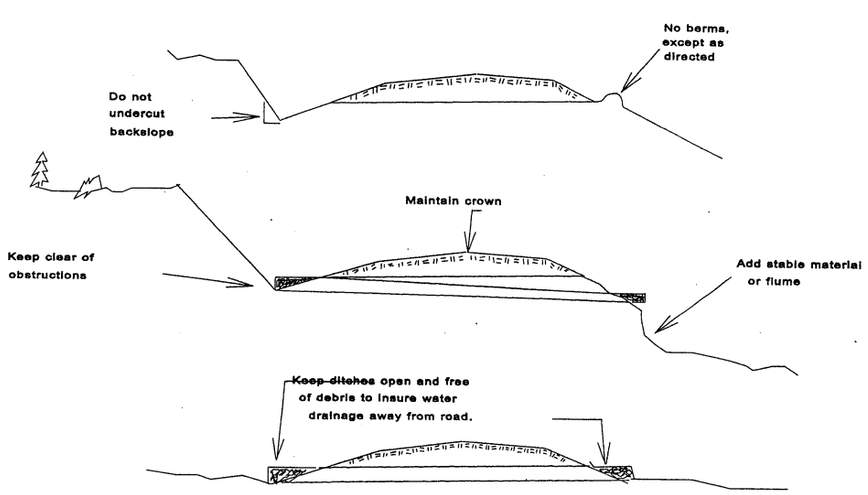
B. Surface
   1. Grade and shape the road surface, turnouts, and shoulders to the original crown, inslope or outslope as directed to provide suitable traveled surface and surface water runoff in an even, unconcentrated manner.
   2. Blading must not undercut the backslope at the bottom of the ditchline or cut geotextile at centerline.
   3. Watering may be required to control dust and to retain fine surface rock.
   4. Desirable surface material shall not be bladed off the roadway.
   5. Replace surface material lost or worn away.
   6. Remove berms except as directed by the State.
   7. Barrel spread soft spots to prevent degradation of geotextile.

C. Drainage
   1. Keep ditches and drainage channels at outlets and inlets of culverts clear of obstructions and functioning as intended.
   2. Inspect and clean culverts at least monthly, with additional inspections during storms and periods of high runoff. This must be done even during periods of inactivity.
   3. Add stable material at the outlet end of the culvert as needed to stabilize the stream bed.
   4. Headwalls: maintain to the road shoulder level with material that will resist erosion.
   5. Keep silt bearing surface runoff from getting into live streams.

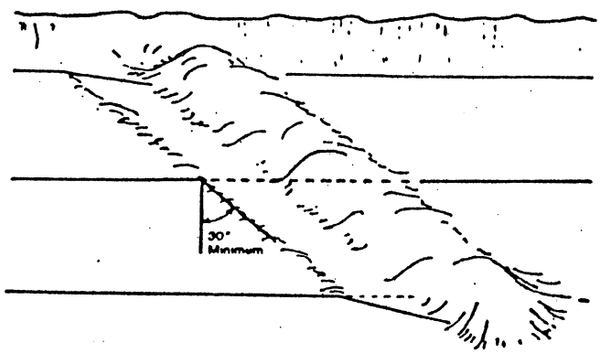
D. Structures
   Repair bridges, culverts, cattleguards, fences, and other road structures to the condition required by the construction specifications.

E. Termination of Use or End of Season
   Do maintenance work to minimize damage from the elements such as blading to insure correct runoff, ditch, and culvert cleaning and water bars.

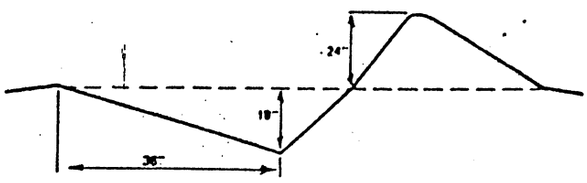
F. Debris
   Remove fallen timber, limbs, and stumps from the slopes or roadway.



WATER BAR DETAIL

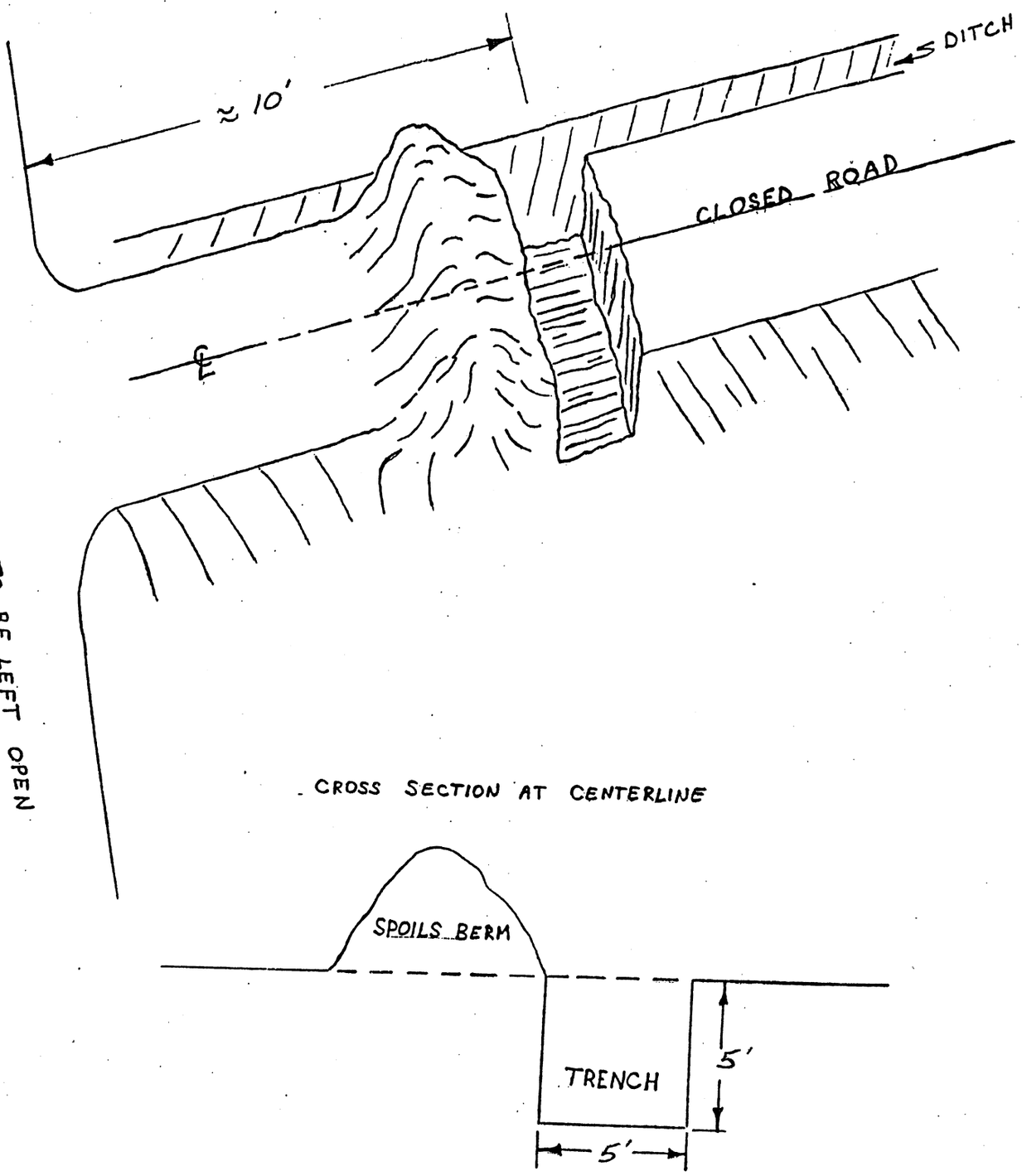


CROSS SECTION AT CENTER LINE



DATE	CONTRACT NO.	PROJECT	SHEET
3/30/04	76209	TOWER	27 OF 30

Road Closure Trench Detail



CROSS SECTION AT CENTERLINE

DATE	CONTRACT NO.	PROJECT	SHEET
3/30/04	76209	TOWER	28 OF 30

MINIMUM PIT DEVELOPMENT AND RECLAMATION SPECIFICATIONS

(A) DEVELOPMENT

1) Pit location is shown on ~~Road Plan and~~ Timber Sale map.

2) Minimum clearing distance from the pit edge shall be 75% of the height of the tallest tree.

3) The pit floor shall be developed so as to provide a smooth, neat and well drained condition.

4) The first face shall have the overburden stripped back a minimum of 15 feet from the pit edge. There shall be no overhangs.

5) Overburden shall be deposited as approved by the State Representative.

6) Oversize shall be deposited within the pit site area in a place designated by the State Representative.

7) Stockpiling operations shall be accomplished in the area as approved by the State Representative. All stockpiled materials shall be maintained in a neat and presentable condition.

(B) RECLAMATION

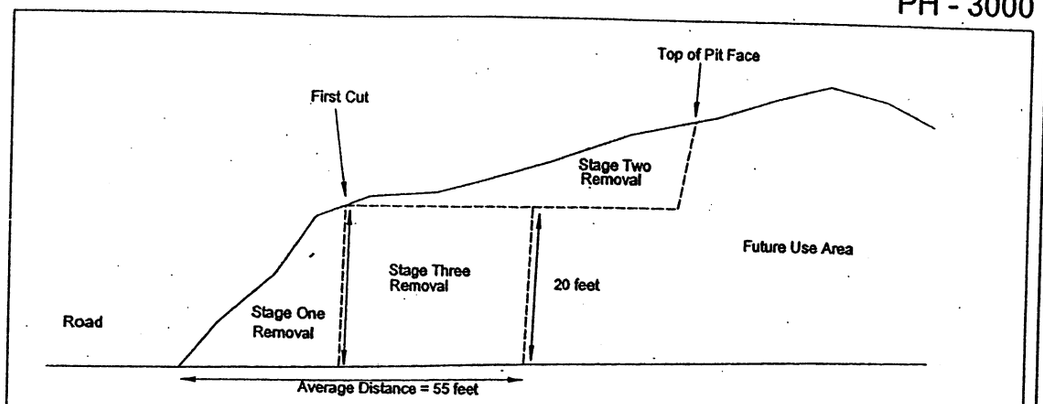
1) Upon completion of operations in the pit, the area will be left in a condition that will not endanger public safety, damage property, or be hazardous to animal or human life.

2) The pit floor and the stockpile floor shall be left in a smooth and neat condition, out sloped a minimum of 2% to provide site drainage.

3) The pit area shall be worked and left in condition that future operations may proceed in an orderly manner.

4) Upon completion of operations, the site shall be cleared of all temporary structures, equipment, and rubbish, and shall be left in a neat and presentable condition.

PH - 3000 Pit Plan



DEVELOPMENT

Overburden shall be placed in the old adjacent pit as directed by the Contract Administrator.

Material shall be removed in such a manner so that no pit face exceed a height of 20 feet or greater. If conditions are such that a benched removal is possible, pit material shall be removed where bench width shall be no smaller than 15 feet. Minimum slope on pit faces shall be 1/4:1.

Minimum clearing distance from the pit edge shall be 75% of the height of the tallest tree. Contractor shall maintain a 20 foot wide stripped area from the pit face at all times.

The pit floor shall be developed so as to provide a smooth, neat and well drained condition. Slope of the pit floor shall be maintained at no less than a 2% slope.

Stock piling operations shall be accomplished in the area as approved by the Contract Administrator. All stock piled material shall be maintained in a neat and usable condition.

A drainage ditch will be maintained between the PH 3000 road and the pit floor during any and all operations in the pit.

Material shall be removed as directed on Page two of this pit plan.

RECLAMATION

Reclamation will be achieved by property removing materials as stated in the Development plan.

If so directed by the landowner, overburden material will be placed in the pit area and shaped to conform as near as possible to the ground profiles around the pit area.

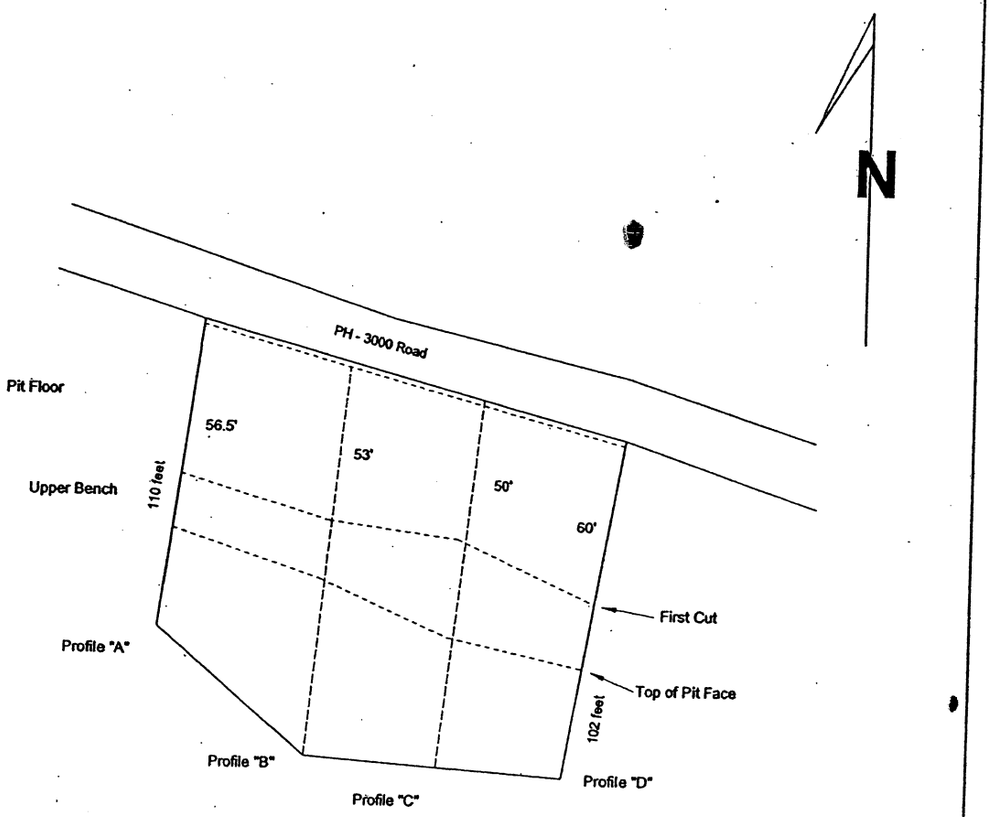
Upon completion of operations in the pit, the area will be left in a condition that will not endanger public safety, damaged property or be hazardous to animal or human life.

Pit floor shall be left in a smooth and neat condition, outsloped a minimum of 2% to provide site drainage. Ditch line will be in operating condition.

Upon completion of operations, the site shall be cleared of all temporary structures, equipment and rubbish.

Rock Pit Plan

Section 20, T6N, R2E



Proposed pit will disturb .456 acres.

Map not Drawn to Scale

March 20, 2000

State of Washington
Department of Natural Resources
Southwest Region

Robert Hoffman
District Engineer
St. Helens District

ROAD COST SUMMARY

Sale Name Tower **Agr. No. 30-0 76209**

Compiled by Stan Ross Date March 30,2004

	Road Cost
Road No. Pre-haul maint	$ 4,646.00
Road No. PH-3700	$ 32,095.58
Road No. PH-3701	$ 39,313.90
Road No.	$
Road No.	$
Total	$ 76,055.48

Sale Volume _____ $/Mbf _____

ROAD COSTING FORM

Sale Name Tower **Agr. No. 30-** 76209 **Road No.** Pre-haul maint

Compiled by Stan Ross Date March 30,2004

No. of Stations 12.7 R/W Width

CLEARING & GRUBBING

	Cat days:		@	$		=	$		
	Excavator days	0.5	@	$	1000.00	=	$	500.00	
	Revegetation:	5	@	$	20.00	=	$	100.00	
									$ 600.00

EXCAVATION

	Cat days:	1.5	@	$	1000.00	=	$	1500.00	
	Excavator days		@	$		=	$		
Endhaul volume			@	$		=	$		
									$ 1,500.00

BALLAST & SURFACING

Depth	yds/sta	X	stations	=	yards

UNIT COSTS	Ballast	Surfacing	Riprap
Drill & shoot	2.00		
Dig & load	1.00		
Purchase			
Haul	1.00		
Spread	0.30		
Compact	0.50		
Strip/Reclaim			
Crush			
Total	4.80		

Ballast Source: PH-3000 pit
Surface Source:
Riprap Source:

Ballast	300	yds	@	$	4.80	/yds = $	1440.00	
Surface		yds	@	$		/yds = $		
Riprap		yds	@	$		/yds = $		
								$ 1,440.00

CULVERTS & FLUMES

G-(Galvanized) P-(Plastic) ED-(energy dissipator) F-(flume)

Diam.	No.	Ga.	Type	Length	Cost/ft	Total

$

ABANDONMENT

	Excavator days		@	$	
			@	$	

$

OTHER

$

MOVE IN

Excav	@	$	500.00	
	@	$		
	@	$		
	@	$		
				$ 500.00

Cost per Station $ 365.83

GENERAL EXPENSES

Subtotal $ 4,040.00 Subtotal X 1.15% **Total** $ 4,646.00

ROAD COSTING FORM

Sale Name Tower **Agr. No. 30-** 76209 **Road No.** PH-3700

Compiled by Stan Ross Date March 30,2004

No. of Stations 11.25 R/W Width

CLEARING & GRUBBING

	Cat days:	3	@	$	1000.00	=	$	3000.00	
	Excavator days	3	@	$	1000.00	=	$	3000.00	
	Revegetation:	11	@	$	20.00	=	$	220.00	
									$ 6,220.00

EXCAVATION

	Cat days:	1.5	@	$	1000.00	=	$	1500.00	
	Excavator days	1.5	@	$	1000.00	=	$	1500.00	
Endhaul volume		6000	@	$	1.75	=	$	10500.00	
									$ 13,500.00

BALLAST & SURFACING

Depth	yds/sta	X	stations	=	yards

UNIT COSTS	Ballast	Surfacing	Riprap
Drill & shoot	2.00		
Dig & load	1.00		
Purchase			
Haul	1.00		
Spread	0.30		
Compact	0.50		
Strip/Reclaim			
Crush			
Total	4.80		

Ballast Source: PH-3000 pit
Surface Source:
Riprap Source:

Ballast	1179	yds @ $	4.80	/yds = $	5659.20		
Surface		yds @ $		/yds = $			
Riprap		yds @ $		/yds = $			
							$ 5,659.20

CULVERTS & FLUMES

G-(Galvanized) P-(Plastic) ED-(energy dissipator) F-(flume)

Diam.	No.	Ga.	Type	Length	Cost/ft	Total
18"	3	16	G	102	15.00	1530.00

$ 1,530.00

ABANDONMENT

	Excavator days		@	$	
			@	$	
					$

OTHER

$

MOVE IN

Dozer	@	$	500.00	
Drill	@	$	500.00	
	@	$		
	@	$		
				$ 1,000.00

Cost per Station $ 2852.94

GENERAL EXPENSES **Subtotal** $ 27909.20 Subtotal X 1.15% **Total** $ 32,095.58

ROAD COSTING FORM

Sale Name Tower **Agr. No. 30-** 76209 **Road No.** PH-3701

Compiled by Stan Ross **Date** March 30,2004

No. of Stations 16.99 **R/W Width**

CLEARING & GRUBBING

	Cat days:	4	@	$	1000.00	=	$	4000.00	
	Excavator days	4	@	$	1000.00	=	$	4000.00	
	Revegetation:	17	@	$	20.00	=	$	340.00	
									$ 8,340.00

EXCAVATION

	Cat days:	2	@	$	1000.00	=	$	2000.00	
	Excavator days	2	@	$	1000.00	=	$	2000.00	
Endhaul volume		5000	@	$	2.00	=	$	10000.00	
									$ 14,000.00

BALLAST & SURFACING

Depth	yds/sta	X	stations	=	yards

UNIT COSTS	Ballast	Surfacing	Riprap
Drill & shoot	2.00		
Dig & load	1.00		
Purchase			
Haul	1.00		
Spread	0.30		
Compact	0.50		
Strip/Reclaim			
Crush			
Total	4.80		

Ballast Source: PH-3000 pit
Surface Source:
Riprap Source:

Ballast	1945	yds	@	$	4.80	/yds = $	9336.00	
Surface		yds	@	$		/yds = $		
Riprap		yds	@	$		/yds = $		
								$ 9,336.00

CULVERTS & FLUMES

G-(Galvanized) P-(Plastic) ED-(energy dissipator) F-(flume)

Diam.	No.	Ga.	Type	Length	Cost/ft	Total
18"	1	16	G	34	15.00	510.00
18"	1	16	F	20	10.00	200.00

$ 710.00

ABANDONMENT

	Excavator days	0.5	@	$	1000.00	
			@	$		
						$ 500.00

OTHER

$

MOVE IN

Loader	@	$	500.00	
Trucks	@	$	300.00	
Roller	@	$	500.00	
	@	$		
				$ 1,300.00

Cost per Station $ 2313.94

GENERAL EXPENSES **Subtotal** $ 34186.00 Subtotal X 1.15% **Total** $ 39,313.90